DECEMBER 1988

SYSTEMS INTEGRATION
A COMPETITIVE ANALYSIS

INPUT®

1953 Gallows Road, Suite 560, Vienna, Virginia 22182

(703) 847-6870

Published by
INPUT INC.
8298 Old Courthouse Rd.
Vienna, Virginia 22182
U.S.A.

Systems Integration Program (SIP)

Systems Integration—
A Competitive Analysis

Copyright ©1988 by INPUT. All rights reserved.
Printed in the United States of America.
No part of this publication may be reproduced or distributed in any form or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

SIM2 • 426 • 1988

Table of Contents

I Introduction I-1

A. Objectives I-3
B. Scope and Methodology I-4
1. Scope I-4
2. Methodology I-4
C. Report Structure I-5
D. Related INPUT Reports I-6

II Executive Overview II-1

A. Background and Methodology II-1
1. Background II-1
2. Methodology II-3
B. Primary Findings II-6
1. Competitive Structure II-6
2. Vendors' Business Objectives II-8
3. Organizational Approach II-9
4. Financial Characteristics II-10
5. Strategies and Markets II-12
6. Capabilities and Products II-13
a. Overall Capabilities II-14
b. Implementation Skills/Alliances II-15
c. Proprietary Products II-16
7. Overall Evaluation II-16
C. Trends and Issues II-18
D. Conclusions and Observations II-19

III Background III-1

A. SI and the Industry Structure III-1
B. Definitions III-2
1. Systems Integration III-2
2. Other Definitions III-4
3. Turnkey Systems versus Systems Integration III-4

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

III

C. Synopsis of the Market Forecast III-6
1. Total Market—Federal and Commercial III-6
2. Industry Segmentation III-8
D. User Driving Forces III-9

IV

Competitive Structure IV-1

A. Competitive Segmentation IV-3
B. Vendor Driving Forces IV-4
1. User Trends and Issues IV-4
2. SI Vendor Business Objectives IV-6
C. Conclusions—Competitive Structure IV-9

V

Systems Integrator Profiles (Full) V-1

A. Unisys Corporation V-3
1. Key SI Contacts V-3
2. Description of Principal Business V-3
3. Company Competitive Position V-4
4. Markets Served V-5
5. Recent Events V-5
6. SI Organization V-5
a. Staffing for Systems Integration V-7
b. Organizational Structure V-8
7. SI Business Objectives V-11
8. SI Capabilities Evaluation V-11
9. SI Strategic Alliances V-13
10. SI Capabilities Summary V-15
11. SI Marketing Strategy V-15
12. SI Customer Base/Specific Projects V-16
13. Summary and Future Directions V-18
B. Andersen Consulting V-19
1. Key Contacts V-19
2. Description of Principal Business V-19
3. Andersen Consulting Competitive Position V-21
4. Markets Served V-22
5. Recent Events V-22
6. SI Organization V-24
7. SI Business Objectives V-26
8. SI Capabilities Evaluation V-27
9. SI Strategic Alliances V-28
10. SI Capabilities Summary V-29

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

11. SI Marketing Strategy V-30
12. SI Customer Base/Specific Projects V-32
13. Summary and Future Directions V-32

C. International Business Machines (IBM) V-34
1. Key SI Contacts V-34
2. Description of Principal Business V-34
3. IBM Competitive Position V-35
4. Markets Served V-35
5. Recent Events V-35
6. SI Organization V-37
7. SI Objectives and Revenue V-40
8. Internal SI Capabilities Evaluation V-41
9. SI Strategic Alliances V-44
10. SI Capabilities Summary V-44
11. SI Marketing Strategy V-46
    a. Customer Benefits Promoted V-46
    b. Application Targets V-46
    c. Industry Targets V-46
    d. Advanced Technology Centers V-46
    e. Promotional Strategy V-46
12. SI Customer Base V-47
13. Summary SI Evaluation V-47
    a. Capabilities V-47
    b. Possible Weaknesses V-48
14. Future IBM Directions in SI V-49

D. Digital Equipment Corporation (DEC) V-50
1. Key SI Contacts V-50
2. Description of Principal Business V-50
3. Company Competitive Position V-51
4. Markets Served V-52
5. Recent Events V-52
6. SI Organization V-54
7. SI Business Objectives V-55
8. SI Capabilities Evaluation V-55
9. SI Strategic Alliances V-57
10. SI Capabilities Summary V-59
11. SI Marketing Strategy V-60
12. SI Customer Base V-61
13. Summary and Future Directions V-62

E. American Telephone & Telegraph Company (AT&T) V-63
1. Key SI Contacts V-63
2. Description of Principal Business V-63
3. Competitive Position V-63
4. Markets Served V-66
5. Recent Events V-66

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

6. SI Organization V-67
7. SI Business Objectives V-68
8. SI Capabilities Evaluation V-70
9. SI Strategic Alliances V-71
10. SI Capabilities Summary V-73
11. SI Marketing Strategy V-74
12. SI Customer Base V-74
13. Summary and Future Directions V-75

F. Computer Task Group (CTG) V-78
1. Key SI Contacts V-78
2. Description of Principal Business V-78
3. Company Competitive Position V-79
4. Markets Served V-80
5. Recent Events of Interest V-80
6. SI Organization V-81
7. SI Business Objectives V-83
8. SI Capabilities Evaluation V-84
9. SI Strategic Alliances V-85
10. SI Capabilities Summary V-86
11. SI Marketing Strategy V-87
12. SI Customer Base V-88
13. Summary and Future Directions V-89

G. Electronic Data Systems (EDS) V-91
1. Key SI Contacts V-91
2. Description of Principal Business V-91
3. EDS Competitive Position V-92
4. Markets Served V-92
5. Recent Events V-93
6. EDS Organization V-94
7. SI Objectives and Revenues V-98
8. Internal SI Capabilities Evaluation V-99
9. SI Strategic Alliances V-100
10. SI Capabilities Summary V-101
11. SI Marketing Strategy V-103
12. SI Customer Base V-103
13. Summary and Future Directions V-104

H. SHL Systemhouse (SHL) V-106
1. Key SI Contacts V-106
2. Description of Principal Business V-106
3. Systemhouse's Competitive Position V-107
4. Markets Served V-108
5. Recent Events V-108
6. SI Organization V-109
7. SI Business Objectives V-112

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

8. Internal SI Capabilities Evaluation V-112
   a. Business Consulting V-113
   b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation V-113
   c. Packaged Application Software V-113
   d. Packaged Systems Software V-114
   e. Standard Computer Hardware V-114
   f. Custom Computer Hardware V-114
   g. Network Management and Operations V-114
   h. Service and Repair V-114
   i. Software Maintenance V-114
9. SI Strategic Alliances V-114
10. SI Capabilities Summary V-115
11. SI Marketing Strategy V-115
12. SI Customer Base V-116
13. Summary and Future Direction V-117

I. Computer Sciences Corporation (CSC) V-119
   1. Key SI Contacts V-119
   2. Description of Principal Business V-119
   3. CSC Competitive Position V-120
   4. Markets Served V-122
   5. Recent Events V-123
   6. CSC Organization V-125
   7. SI Business Objectives V-127
   8. Internal SI Capabilities Evaluation V-128
      a. Business Consulting V-128
      b. Design Methodology V-128
      c. Design and Integration, Project Management, Software Development, and Education, Training and Documentation V-128
      d. Packaged Application Software V-128
      e. Packaged Systems Software, Standard Computer Hardware and Custom Computer Hardware V-128
      f. Network Management and Operations V-128
      g. Service and Repair
      h. Software Maintenance V-129
   9. SI Strategic Alliances V-129
   10. SI Capabilities Summary V-129
   11. SI Marketing Strategy V-130
   12. SI Customer Base V-131
   13. Summary and Future Directions V-133

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

J. American Management Systems V-134
1. Key SI Contacts V-134
2. Description of Principal Business V-134
3. Competitive Position V-135
4. Markets Served V-137
5. Recent Events V-139
6. SI Organization V-140
7. SI Business Objectives V-141
8. Internal SI Capabilities Evaluation V-141
a. Business Consulting V-141
b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation V-141
c. Packaged Application Software V-141
d. Packaged Systems Software V-142
e. Standard Computer Hardware V-142
f. Custom Computer Hardware V-142
g. Network Management and Operations V-142
h. Service and Repair V-142
i. Software Maintenance V-142
9. SI Strategic Alliances V-143
10. SI Capabilities Summary V-143
11. Marketing Strategy V-143
12. SI Customer Base V-144
13. Summary and Future Direction V-144
K. McDonnell Douglas Information Systems Company V-145
1. Key SI Contact V-145
2. Description of Principal Business V-145
3. Competitive Position V-147
4. Markets Served V-147
5. Recent Events V-148
6. SI Organization V-148
7. SI Business Objectives V-149
8. Internal SI Capabilities Evaluation V-149
a. Business Consulting V-149
b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation V-149
c. Packaged Application Software V-149
d. Packaged Systems Software V-150
e. Standard Computer Hardware V-150
f. Custom Computer Hardware V-150
g. Network Management and Operations V-150
h. Service and Repair V-150
i. Software Maintenance V-150

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

9. SI Strategic Alliances V-150
10. SI Systems Capabilities V-151
11. Marketing Strategy V-151
12. SI Customer Base V-151
13. Summary and Future Direction V-152

L. NYNEX Information Solutions Group
1. Key SI Contacts V-153
2. Description of Principal Business V-153
3. Competitive Position V-154
4. Markets Served V-156
5. Recent Events V-156
6. SI Organization V-157
7. SI Business Objectives V-160
8. Internal SI Capabilities Evaluation V-160
a. Business Consulting V-160
b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation V-160
c. Packaged Application Software V-160
d. Packaged Systems Software V-161
e. Standard Computer Hardware V-161
f. Custom Computer Hardware V-161
g. Network Management and Operations V-161
h. Service and Repair V-161
i. Software Maintenance V-161
9. SI Strategic Alliances V-162
10. SI Capabilities Summary V-162
11. Marketing Strategy V-162
12. SI Customer Base V-163
13. Summary and Future Direction V-163

M. Science Applications International Corporation V-164
1. Key SI Contacts V-164
2. Description of Principal Business V-164
3. Competitive Position V-165
4. Markets Served V-166
5. Recent Events V-168
6. SI Organization V-168
7. SI Business Objectives V-169
8. SI Capabilities Summary V-169
9. Internal SI Capabilities Evaluation V-172
10. SI Strategic Alliances V-172
11. SI Marketing Strategy V-172
12. SI Customer Base/Specific Projects V-173
13. Summary and Future Directions V-173

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

N. Boeing Computer Services V-174
1. Key SI Contacts V-174
2. Description of Principal Business V-174
3. Competitive Position V-175
4. Markets Served V-177
5. Recent Events V-178
6. SI Organization and Staffing V-178
7. SI Business Objectives V-179
8. SI Capabilities Summary V-179
9. SI Capabilities Evaluation V-180
a. Consulting/User Requirements Analysis V-180
b. Design/Integration V-181
c. Project Management V-181
d. IS Hardware V-181
e. Communications Hardware V-181
f. Software Development V-181
g. Application Software V-182
h. Systems Software V-182
i. Education, Training, Documentation V-182
j. Service and Repair V-182
10. SI Strategic Alliances V-182
11. SI Marketing Strategy V-184
12. SI Customer Base/Specific Projects V-185
13. Summary and Future Directions V-186

VI Systems Integrator Profiles (Partial) VI-1

A. Bechtel Information Technology VI-3
1. Key Contacts VI-3
2. Background and Current Status VI-3
3. Organization and Market Participation VI-3
4. SI Capabilities Summary VI-4
5. Marketing Strategy and Approach VI-6
a. Positioning and Promotion VI-6
b. Customer Base/Specific Projects VI-7
6. Summary and Future Directions VI-7
B. Litton Computer Services (LCS) VI-9
1. Key Contacts VI-9
2. Background and Current Status VI-9
3. Organization and Market Participation VI-9
4. SI Capabilities Summary VI-10
5. Marketing Strategy and Approach VI-11
a. Positioning and Promotion VI-12
b. Customer Base/Specific Projects VI-12
6. Summary and Future Directions VI-12

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

C.	Grumman Data Systems	VI-15
1.	Key Contacts	VI-15
2.	Background and Current Status	VI-15
3.	Organization and Market Participation	VI-15
4.	SI Capabilities Summary	VI-16
5.	Marketing Strategy and Approach	VI-17
	a. Positioning and Promotion	VI-18
	b. Customer Base/Specific Projects	VI-18
6.	Summary and Future Direction	VI-18
VII	Comparative Analysis	VII-1
A.	Organization/Responsibilities	VII-2
1.	Centralization vs. Decentralization	VII-3
2.	Allocation of Resources	VII-5
3.	Conclusions—Organization/Responsibilities	VII-6
B.	Financial Characteristics	VII-7
1.	Leading Competitors' Revenues	VII-7
2.	Project Values and Revenue Growth Rates	VII-8
3.	Profitability and Margins	VII-9
C.	Strategies and Markets	VII-12
1.	Market Selection	VII-12
2.	Market Promotion	VII-17
3.	Competition	VII-18
D.	Capabilities and Products	VII-19
1.	Overall Capabilities and Skills	VII-19
2.	SI Alliances	VII-22
3.	Proprietary Products/Technologies	VII-25
E.	Overall Comparison of Competitors	VII-27
VIII	Trends and Issues	VIII-1
A.	Technology as a Competitive Lever	VIII-1
1.	The Hierarchy of Integration Products	VIII-2
2.	Systems Integrator Capabilities	VIII-5
3.	Conclusions	VIII-6
B.	The Evolution of Full-Service Capabilities	VIII-8
C.	Acquisitions/Mergers	VIII-11
D.	Summary	VIII-13

© 1990 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

IX Summary and Conclusions IX-1

A. SI Competitive Drivers IX-1
B. Organizational Approach IX-3
C. Financial Characteristics IX-4
D. Strategy and Markets IX-5
E. Capabilities and Products IX-6
F. Issues and Future Trends IX-8
   1. The Federal Crossover IX-8
   2. The Impact of Telecommunications Companies IX-8
   3. Project Management IX-9
   4. Mergers/Acquisitions IX-9
   5. Future Sources of Competition IX-9
G. Closing IX-10

A Appendix: Vendor Questionnaire A-1

© 1990 by INPUT. Reproduction Prohibited.

Exhibits

I

-1	Information Services Industry Structure, 1988	I-2
-2	Secondary Study Objectives	I-3
-3	Secondary Information Sources	I-5

II

-1	U.S. Information Services Market Structure	II-2
-2	Systems Integration Market Forecast	II-2
-3	Major IS Management Issues	II-4
-4	Companies Interviewed	II-4
-5	Interview Subject Areas	II-5
-6	Primary Factors Influencing SI Competitive Structure	II-7
-7	Analysis of Vendors' SI Business Objectives, Total Population	II-8
-8	Future Organizational Structure of SI Vendors	II-10
-9	Leading SI Vendors Ranked by Revenue	II-11
-10	SI Vendors' Market Focus	II-13
-11	Overall SI Capabilities by Class	II-14
-12	Classification of SI Skills	II-16
-13	Overall Vendor Comparison by Class	II-17
-14	Issues and Trends	II-18

III

-1	Original SI Market Definition	III-2
-2	Current SI Market Definition	III-3
-3	Differences Between Systems Integrators and Turnkey Systems Vendors	III-5
-4	Projected Information Services Markets by Mode, 1993	III-6
-5	Systems Integration Market Forecast	III-7
-6	Major Buyer Issues	III-10

© 1990 by INPUT. Reproduction Prohibited.

Exhibits (Continued)

IV

-1	Primary Factors Structuring the SI Market	IV-2
-2	SI Respondent Demographics/Classification	IV-3
-3	Vendor Perceptions of User Issues and Trends	IV-5
-4	SI User Motivations (Vendors' View)	IV-6
-5	Analysis of Vendors' SI Business Objectives—Total Population	IV-8
-6	Analysis of Vendors' SI Business Objectives by Company Class	IV-9

V

-1	Systems Integrator Profiles (Full)	V-2a

Unisys (UNI)

-1	Unisys Systems Integration Revenues, 1988	V-4
-2	Unisys' SI Target Market Opportunities	V-5
-3	Centralization/Decentralization of SI Business Function—Unisys	V-6
-4	Unisys Staffing for the SI Business	V-7
-5	Distribution of Commercial SI Personnel—Unisys	V-8
-6	Unisys U.S. IS Organization	V-10
-7	Unisys U.S. Commercial SI Organization	V-11
-8	Unisys' Assessment of SI Capabilities and Use of Alliances	V-12
-9	Unisys Strategy—Alliances	V-14
-10	Unisys Strategic Alliances	V-14
-11	Unisys Marketing Strategy	V-16
-12	Unisys SI Project Examples	V-18

Andersen Consulting (AC)

-1	Key Parameters of Andersen Consulting's Consulting/SI Business	V-20
-2	Andersen Consulting's Competitive Status	V-21
-3	Andersen Consulting—Major Recent Developments	V-24
-4	Centralization/Decentralization of SI Business Function—Andersen Consulting	V-25
-5	Distribution of SI Business Personnel—Andersen Consulting	V-26
-6	Andersen Consulting—Applications Software Products, Some Examples	V-28
-7	Andersen Consulting—SI Strategic Alliances (Limited Sample)	V-29
-8	Andersen Consulting Marketing Strategy	V-31
-9	Examples of Andersen Consulting's SI Contracts	V-33

© 1990 by INPUT. Reproduction Prohibited.

Exhibits (Continued)

V

IBM
-1 IBM U.S. Organization V-36
-2 IBM Application—Solutions V-38
-3 IBM Staffing for the SI Business V-39
-4 IBM Systems Integration Revenues, 1988 V-40
-5 IBM Strategic Partners in Systems Integration V-45
-6 INPUT's Evaluation of IBM's SI Capabilities V-45
-7 IBM SI Project Examples V-47

Digital Equipment Corporation (DEC)
-1 DEC Systems Integration Revenues, 1988 V-51
-2 DEC's SI Target Market Opportunities V-53
-3 Centralization/Decentralization of SI Business Function—Digital Equipment V-54
-4 DEC—Limited Sample of SI Alliances V-58
-5 INPUT's Evaluation of DEC's SI Capabilities V-59
-6 Examples of DEC's SI Projects V-61

American Telephone & Telegraph Company (AT&T)
-1 AT&T's Competitive Position V-64
-2 Centralization/Decentralization of SI Business Function—AT&T V-68
-3 Distribution of Commercial SI Personnel—AT&T V-69
-4 AT&T Strategic Alliances V-72
-5 Examples of AT&T's SI Projects V-75
-6 INPUT's Evaluation of AT&T's SI Capabilities V-76

Computer Task Group (CTG)
-1 CTG's Primary Market Targets V-79
-2 Centralization/Decentralization of SI Business Function—Computer Task Group V-82
-3 Distribution of SI Personnel—Computer Task Group V-83
-4 Examples of CTG's Key Alliances V-86
-5 CTG's SI Marketing Strategy V-88
-6 Computer Task Group SI Project Examples V-89

Electronic Data Systems (EDS)
-1 SI Vertical Market Focus—EDS V-93
-2 Recent Major Developments V-94
-3 EDS Systems Integration Revenues, 1988 V-94
-4 Distribution of SI Personnel—EDS V-95
-5 EDS Organization V-96
-6 EDS Estimated Revenue Distribution, 1988 V-97
-7 Centralization/Decentralization of SI Business Functions—Electronic Data Systems V-98

© 1990 by INPUT. Reproduction Prohibited.

Exhibits (Continued)

V

-6 EDS Estimated Revenue Distribution, 1988 V-97
-7 Centralization/Decentralization of SI Business Functions—Electronic Data Systems V-98
-8 EDS Business Objectives V-99
-9 EDS—Strategic Alliances V-101
-10 EDS's Competitive Status V-102
-11 EDS SI Marketing Strategy V-103
-12 Examples of EDS's Customers and Contracts V-104

SHL Systemhouse (SHL)
-1 SHL Systems Integration Revenues, 1988 V-107
-2 Systemhouse U.S. Organization V-110
-3 Centralization/Decentralization of Business Functions—Systemhouse V-111
-4 Distribution of SI Personnel—Systemhouse V-112
-5 SHL Systemhouse—Strategic Alliances V-115
-6 Examples of Systemhouse's SI Programs V-117

Computer Sciences Corporation (CSC)
-1 Fiscal Year 1989 Revenues by Business Segment V-120
-2 CSC Fiscal Year Revenues by Major Market V-121
-3 CSC Systems Integration Revenues—1988 V-122
-4 SI Market Focus—CSC V-123
-5 Major Recent Developments V-124
-6 CSC Organization V-125
-7 CSC Distribution of SI Personnel V-126
-8 Centralization/Decentralization of SI Business Functions V-127
-9 CSC Competitive Status V-130
-10 CSC SI Marketing Strategy V-130
-11 Examples of CSC's Customers and Contracts V-132

American Management Systems
-1 AMS Offerings by Market V-134
-2 AMS Markets: Size and Growth V-135
-3 AMS 1989 Systems Integration Revenues V-136
-4 AMS Margins V-137
-5 AMS Submarkets V-138
-6 AMS Organization—Centralization & Decentralization by Line of Business V-140

McDonnell Douglas Systems Integration Company
-1 McDonnell Douglas Information Systems Company Restructuring V-146
-2 1989 Systems Integration Revenues V-147

© 1990 by INPUT. Reproduction Prohibited.

Exhibits (Continued)

V

-3 Systems Integration Company Profit Centers V-148
-4 Representative Systems Integration Company Projects V-152

NYNEX
-1 NYNEX 1989 Systems Integration Revenues V-154
-2 NYNEX Information Solutions Group, Inc. Organization V-158
-3 NYNEX Complex Systems Integration Group—Services Offered V-159

Science Applications International Corporation
-1 SAIC 1989 Systems Integration Revenues V-165
-2 SAIC Historical Revenue V-165
-3 Three-Year Source of Revenue Summary V-167
-4a SAIC Technology Development and Analysis Capabilities V-170
-4b SAIC Systems Development and Integration Capabilities V-170
-4c SAIC Technical Support Services Capabilities V-171
-4d SAIC Energy Systems Integration Capabilities V-171
-4e SAIC Capabilities—Other Fields of Concentration V-171

Boeing Computer Services
-1 BCS Systems Integration Revenues, 1989 V-175
-2 BCS Strengths and Weaknesses V-176
-3 Boeing Organization V-177
-4 BCS Strategic Alliances V-183
-5 BCS Marketing Strategy V-185
-6 BCS Summary V-187

VI

-1 Systems Integrator Profiles (Partial) VI-2

Bechtel (BEC)
-1 Parameters of Bechtel's SI Business VI-4
-2 Summary of Bechtel's SI Capabilities VI-5
-3 Bechtel's Strengths and Weaknesses in SI VI-8

Litton Computer Services (LCS)
-1 Parameters of Litton's SI Business VI-10
-2 Summary of Litton's SI Capabilities VI-10
-3 Litton's Strengths and Weaknesses in SI VI-13

© 1990 by INPUT. Reproduction Prohibited.

Exhibits (Continued)

VI

Grumman Data Systems
-1 Parameters of Grumman's SI Business VI-16
-2 Summary of Grumman's SI Capabilities VI-17
-3 Grumman's SI Strengths and Weaknesses VI-19

VII

-1 Distribution of Respondent Interviews VII-2
-2 Primary Organizational Structure for Systems Integrators VII-3
-3 Degree of Centralization of Business Function VII-4
-4 Allocation of SI Resources by Function VII-5
-5 Future Organizational Structure of SI Vendors VII-6
-6 Systems Integration Revenues, 1988 VII-7
-7 Leading Competitors in Commercial and Federal SI VII-8
-8 Survey Sample Project Sizes VII-9
-9 Respondents' Forecast of SI Revenue Growth VII-9
-10 Trends in SI Profitability VII-10
-11 Margins by Integration Component VII-11
-12 Market Selection Criteria VII-12
-13 SI Vendors' Market Focus VII-13
-14 Target Industries for SI Vendors VII-14
-15 Summary of Vertical Market Characteristics VII-15
-16 Target Functional SI Markets VII-16
-17 Evaluation of SI Promotion Techniques VII-17
-18 SI Competition Ranked by Number of Mentions VII-18
-19 Overall SI Capabilities by Class VII-20
-20 Formal Alliance Programs VII-22
-21 Alliance Structures VII-23
-22 Amenity to Use Alliances by Class VII-24
-23 Use of Proprietary Technologies/Products VII-25
-24 Incidence of Proprietary Products by Category VII-26
-25 Classification of SI Skills VII-28
-26 Overall Vendor Comparison by Class VII-29

VIII

-1 Hierarchy of Integration Technologies VIII-2
-2 Examples of Integration Products/Standards VIII-4
-3 Process for Development of Integrating Technologies VIII-7
-4 Technology Trends—Multivendor Integration VIII-7
-5 Motivators for Becoming Full-Service VIII-10
-6 Motivating Factors for Acquisition/Merger VIII-11
-7 Brief Sampling of SI Acquisitions VIII-12

© 1990 by INPUT. Reproduction Prohibited.

Exhibits (Continued)

IX

-1 Competitive Driving Forces IX-2
-2 Organizational Approach IX-4
-3 Financial Characteristics IX-5
-4 Strategy and Markets IX-6
-5 Capabilities and Products IX-7

© 1990 by INPUT. Reproduction Prohibited.

Systems Integrator Profiles (Full)

This chapter contains detailed analyses of major SI competitors in profile format. The general format of the profiles is the same. However, there are some minor variations among profiles depending upon the nature of the vendor and the availability of information. In general the structure is as follows:

- Key SI Contacts - A listing of principal systems integration contacts in the management structure of the vendor organization
- Description of the Principal Business - A summary of the history of the firm focusing on key points relevant to the company's participation in the systems integration business
- Company Competitive Position - A discussion of the company's position in the information systems/systems integration marketplace
- Markets Served - A description of the vertical and cross-industry markets currently served by the company
- Recent Events - A history of recent events, including merger and acquisition activity, significant product announcements, etc., relevant to the company's posture in the systems integration market
- SI Organization - A detailed analysis of how the firm is organized to support its SI business operations. This section typically includes information on the structure, number of employees involved and their distribution over various SI activities, as well as organizational trends, etc.
- SI Business Objectives - A discussion of the factors motivating the vendor to be in the systems integration business.
- SI Capabilities Evaluation - INPUT's assessment of the vendor's capabilities in 14 specific areas based on direct discussion with the

© 1990 by INPUT. Reproduction Prohibited.

vendor and INPUT's evaluation of other information related to alliances, competition, etc.

- SI Strategic Alliances - A discussion of how the company uses alliances and under what type of business relationship and a synopsis of the vendor's specific alliances.
- SI Capabilities Summary - INPUT's synopsis of the overall capability of a given vendor for its target markets.
- SI Marketing Strategy - A discussion of the company's general approach to the market with specific comments on companies it sees as competitors, how it positions itself within the market, and how it promotes its systems integration services.
- SI Customer Base/Specific Projects - A listing of some typical projects and an analysis of its current source of prospects.
- Summary and Future Directions - INPUT's interpretation of the company's current position in the market and its likely future directions.

Exhibit V-1 contains the list of profiles released with this report. Each profile has been given a release date indicating when the profile was last updated. The profiles are treated as subsections of this chapter. They are not presented in any particular order. Additional profiles will be released at future dates, and existing profiles will be updated to reflect substantive changes in a vendor's position or offering.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT V-1

Systems Integrator Profiles (Full)

Chapter Subsection/Integrator	Date
A Unisys Corporation	APR-89
B Andersen Consulting	APR-89
C International Business Machines (IBM)	APR-89
D Digital Equipment Corporation (DEC)	APR-89
E American Telephone & Telegraph (AT&T)	APR-89
F Computer Task Group (CTG)	APR-89
G Electronic Data Systems (EDS)	APR-89
H SHL Systemhouse	APR-89
I Computer Sciences Corporation	OCT-89
J American Management Systems (AMS)	JAN-90
K McDonnell Douglas	JAN-90
L NYNEX	JAN-90
M Science Applications International Corporation (SAIC)	JAN-90
N Boeing Computer Services	JAN-90

© 1990 by INPUT. Reproduction Prohibited.

(Intentionally left blank)

© 1990 by INPUT. Reproduction Prohibited.

A

Unisys Corporation

1. Key SI Contacts

Federal

H. B. Traylor
Vice President & General Manager
Federal Information Systems
8008 Westpark Drive
McLean, VA 22101

James M. Bridger
President
Systems Development Group
Unisys Defense Systems
8201 Greensboro Drive
McLean, VA 22101

Commercial

R. E. Johnson
Vice President
Systems Integration
P.O. Box 500
Blue Bell, PA 19421

2. Description of Principal Business

Unisys, the resulting combination of Sperry Corporation and Burroughs Corporation, is principally in the computer hardware, software, and services market. The company manufactures and sells a range of systems—from high-performance mainframes to microcomputer-based systems. Unisys' 1988 revenues make it the number-three vendor in the computer systems business.

Unisys, following the merger, was structured to provide better focus and direction to the company's deployment of resources and to offer products and services that fulfill the needs of the company's targeted markets. The internally issued doctrine about the merger was not that one company would absorb the other, but that elements of both companies would be retained as building blocks for a new company that would provide products and services that satisfy the needs of the market. The spirit conveyed by the chairman, W. Michael Blumenthal, was one of partnership, merit, unity, and dispatch. The partnership was one of two equals being combined. Merit was the basis for staff selection, company procedure, and extracting the disciplines to give Unisys a new and consistent direction. Dispatch was the basis for accomplishing the combination. This quick action and resolve makes Unisys a formidable competitor in all areas it chooses to pursue. Systems integration is one such area.

By almost anyone's standards the merger has been successful. With 1987 revenues in the $9 - $10 billion range, Unisys holds the position of being the third-largest computer hardware manufacturer. Finally, the merger has resulted in a greater focus in the information services market. INPUT's estimate of 1987 revenues in information services is well over $1 billion.

© 1988 by INPUT. Reproduction Prohibited.

For 1988 Unisys reported significant revenues for its systems integration business. (See Exhibit UNI-1.)

EXHIBIT UNI-1

UNISYS SYSTEMS INTEGRATION REVENUES, 1988

Business Component	$ Millions
Federal	235
Commercial	100

3. Company Competitive Position

Unisys has particular strength in certain industry segments, such as banking. Emphasis is specifically on interbank networking systems (S.W.I.F.T.), document processing systems and retail distribution systems, manufacturing engineering applications, transportation (reservation, air cargo), communications (telephone billing), and state and local governments (police information, on-line management systems and court management systems).

Though each of these areas was a speciality of one of the two merger partners, the new Unisys company has taken this industry expertise and cross-trained the sales and marketing personnel to provide a more uniform approach to the competitive marketplace.

Unisys has gone on record as being equally committed to both merger partners' installed bases and hardware families of systems products. Though there is something to be gained by the sheer mass of the combination in terms of capabilities, personnel, and product experience, INPUT believes the true leverage will be accomplished in the long term through new programs that provide an opportunity to focus and leverage these disparate skill sets while new hardware/software systems are created.

Systems integration is such a program. Unisys can exploit the skill sets of the two merger partners (especially Burroughs Corporation's federal experience through its former subsidiary, Systems Development Corporation) to make the important transition to the commercial sector.

© 1988 by INPUT. Reproduction Prohibited.

4. Markets Served

Elements of Unisys have participated in the systems integration business for about 20 years. As a corporation, Unisys has a high degree of vertical market orientation. It is part of the stated strategy in systems integration to exploit the traditional lines of business where Unisys has demonstrated strength. In addition, Unisys is pursuing cross-industry opportunities, which would leverage its capability in providing integrated solutions to large network and other infrastructure opportunities. The specific targets for commerical and federal markets are listed in Exhibit UNI-2.

EXHIBIT UNI-2

UNISYS' SI TARGET MARKET OPPORTUNITIES

Commercial Targets	Federal Targets
State and Local Government	All Executive Branches
Finance and Banking	Department of Defense
Manufacturing/Distribution	Independent Agencies
Communications and Airlines	Judicial and Legislative

5. Recent Events

Unisys has recently undergone a restructuring of its Complex Systems Division which combined the SI Marketing and the SI Operations organizations into a single unit under Bob Johnson. The restructuring, along with a redefinition of roles, will strengthen and clarify the SI responsibilities within Unisys. As a result of this restructuring, Unisys will most likely take a more aggressive approach to marketing in the commercial arena.

6. SI Organization

Systems integration within Unisys is housed in three separate organizations. Commercial SI and the non-defense component of federal SI operations are both housed in U.S. Information Systems, under the leadership of J. M. Tucci, President. Each operates as a separate division. The federal business is conducted by the Federal Information Systems Division under the management of H. B. Traylor; the commercial activity

© 1988 by INPUT. Reproduction Prohibited.

is the responsibility of Bob Johnson, VP of Systems Integration, Complex Systems Division. SI for the defense organizations within the federal government is handled by the Defense Systems Group, formerly Systems Development Corporation (SDC).

Both the commercial and federal non-defense SI organizations operate on a matrixed basis. However, the division of responsibilities for conducting the SI business within each organization varies. Exhibit UNI-3 compares how major responsibilities are managed within the commercial and federal organizations respectively. A "**C**" indicates that the responsibility for the activity in question is primarily centralized, a "**D**" decentralized and a "**B**" indicates that the responsibility is shared by both.

EXHIBIT UNI-3

CENTRALIZATION/DECENTRALIZATION OF SI BUSINESS FUNCTION UNISYS

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	B
Marketing and promotion	C	B
Account management/ sales	D	D
Contract review/approval	C	B
Project management/ control	C	D
Implementation/development	D	D
Hardware/software acquisition	C	D
Systems operations	N/A	D

C = Centralized, D = Decentralized, B = Both

© 1988 by INPUT. Reproduction Prohibited.

The more centralized orientation of the Complex Systems organization reflects the need to establish strategy and processes for entering the emerging commercial marketplace. In addition to the "newness" of the market, the Complex Systems Division must deal with multiple industries and a more geographically dispersed customer/prospect set. An interesting approach has been adopted to facilitate cooperation between the existing line-of-business organizations and the recently restructured SI organization within Complex Systems. SI, under Bob Johnson, has an internal sales force focused on working with the line-of-business divisions to find, qualify, and win SI opportunities. The Federal Information Systems Division has been operating a more established business with customers and operations more cleanly focused.

a. Staffing for Systems Integration

Like most of the other SI vendors with backgrounds in computer manufacturing and marketing, Unisys operates the business with a combination of dedicated and supplemental personnel. The dedicated staff focuses on activities such as strategy, marketing, legal support, and contract and general administration of the business. In addition, the centralized organization usually houses specialized capabilities particularly applicable to systems integrations efforts, such as project managers and technical experts. The supplemental staff may come from almost anywhere in the organization and consists basically of two types of resources—those dedicated part time to SI in field positions, such as sales, and those assigned on a project-by-project basis to support implementation. Exhibit UNI-4 indicates the approximate staffing for Unisys federal and commercial SI business.

EXHIBIT UNI-4

UNISYS STAFFING FOR THE SI BUSINESS

Responsibilities	Commercial	Federal
Full-time SI staff	500	2,000
Average additional assigned	Unknown	Unknown

© 1988 by INPUT. Reproduction Prohibited.

While the Complex Systems Division was unable to provide a number for the average additional staff assigned to SI efforts, it was willing to comment that the number was "substantial," leading INPUT to believe that it is probably in the 100-200 range.

As with most full-service vendors, a significant portion of the total personal committed to the SI business are in positions that directly support the implementation process. Exhibit UNI-5 gives some additional details on how the staff supporting the commercial side of Unisys' SI business is distributed.

EXHIBIT UNI-5

DISTRIBUTION OF COMMERCIAL SI PERSONNEL—UNISYS

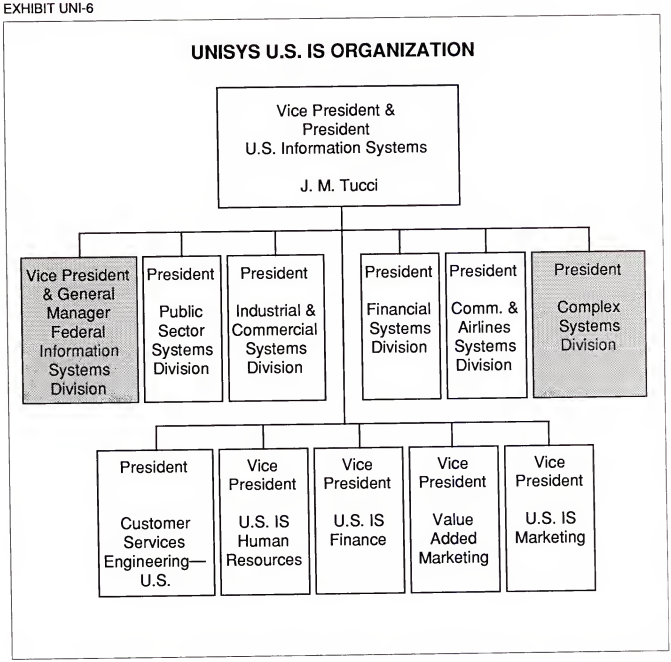
Capability	Percent
Management, strategy, planning, marketing	7
Legal/contract administration, finance	5
Project management and administration	10
Design/development/implementation	69
Hardware/software evaluation/acquisition	1
Hardware engineering	3
Sales	2
Other	3

b. Organizational Structure

Exhibits UNI-6 and UNI-7 show the current organizational structure for Unisys' SI organization. (See attached exhibits.)

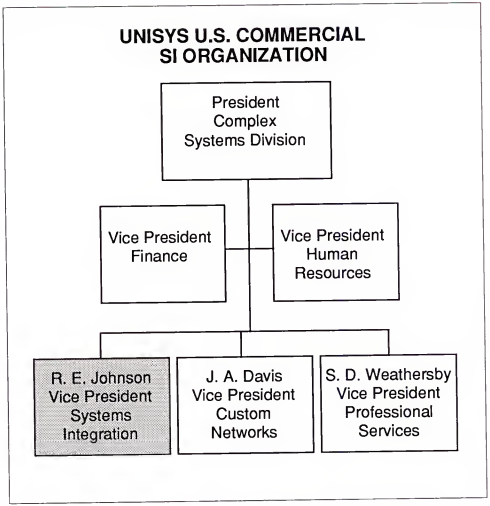
© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT UNI-6


UNISYS U.S. IS ORGANIZATION
Vice President & President U.S. Information Systems
J. M. Tucci
Vice President & General Manager Federal Information Systems Division
President Public Sector Systems Division
President Industrial & Commercial Systems Division
President Financial Systems Division
President Comm. & Airlines Systems Division
President Complex Systems Division
President Customer Services Engineering—U.S.
Vice President U.S. IS Human Resources
Vice President U.S. IS Finance
Vice President Value Added Marketing
Vice President U.S. IS Marketing

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT UNI-7



© 1988 by INPUT. Reproduction Prohibited.

7. SI Business Objectives

Stated broadly, Unisys' objectives are to maintain competitive posture with the industry leader (IBM), increase account penetration, and leverage the SI success that it has had in the federal SI marketplace.

At the time of INPUT's interviews with Unisys, the commercial and federal arms of the business appeared to have somewhat different emphases on their business objectives. Response from Federal Information Systems group indicated that the generation of profits from systems integration as a service offering, in and of itself, was a primary objective, while the Complex Systems organization indicated that this objective was secondary to the objective of being able to offer total solutions capability to customers. On the other hand there were three areas where both divisions appeared to agree. Both considered account control, follow-on hardware/software sales, and response to existing customer requirements to be primary business motivators. On a secondary level, both divisions agreed that part of their mission in the SI business was to support and strengthen the other lines of Unisys' business. Only the Federal Information Systems organization stated that potential follow-on facilities management or systems operations contracts were of any significant interest.

8. SI Capabilities Evaluation

Unisys has a broad base of capabilities which it brings to the systems integration business. Exhibit UNI-8 summarizes Unisys' assessment of its strengths with regard to in-house capabilities for both the commercial and federal markets. In addition, the exhibit indicates those areas where alliances are routinely used.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT UNI-8

UNISYS' ASSESSMENT OF SI CAPABILITIES AND USE OF ALLIANCES

Capability	Strength (High, Medium, Low)		Alliances (Yes/No)	
	Commercial	Federal	Commercial	Federal
Business consulting	Medium	Low	Yes	Yes
Design methodology	High	Medium	No	Yes
Design/integration	High	Medium	No	Yes
Project management	High	High	No	Yes
Software development	Medium	Medium	Yes	Yes
Education/training/documentation	Medium	Medium	Yes	No
Packaged application software	Medium	Medium	Yes	Yes
Packaged systems software	High	High	No	Yes
Standard computer hardware	High	High	No	Yes
Custom computer hardware	High	Medium	Yes	Yes
Communications hardware	High	Medium	Yes	Yes
Network management/operations	High	High	Yes	No
Service and repair	High	High	No	No
Software maintenance	Medium	High	Yes	No

The obvious conclusion is that to some degree Unisys' has in-house the full set of capabilities to provide, sell, and deliver systems integration projects. While Exhibit UNI-8 indicates some differences of opinion between the federal and commercial organizations on the strengths of those capabilities, there are key areas where there is general agreement.

- Neither organization indicates a significant strength in the business consulting area.

© 1988 by INPUT. Reproduction Prohibited.

- Both organizations feel that they have solid, but not outstanding capabilities in the area of software development, training, and packaged applications software.

- Both feel that their capabilities in the project management area are superior.

INPUT believes that like most hardware vendors, Unisys is fully capable in the technical arena and has its biggest hole in the area of business consulting. Clearly, the strong vertical focus of the traditional business can provide support in that area, particularly for commercial systems integration. The question is how that capability can be married into the SI product offering and marketed convincingly to SI prospects.

9. SI Strategic Alliances

To some degree Unisys utilizes alliances in almost all aspects of its systems integration business. One area where alliances are seldom if ever used is service and repair. The areas where alliance are most likely to be used are in business consulting, design, packaged applications software, and custom and communications hardware. Both the federal and commercial organizations utilize long-term and contract-by-contract strategies. Long-term relationships seem to be focused on OEM hardware and software.

Unisys will incorporate products competitive to its own as part of SI proposals. The approach seems to be to analyze the customer's requirements and propose a Unisys-based solution where appropriate. In situations where a Unisys-based solution falls short, Unisys will propose solutions using other vendors' products or services. Exhibit UNI-9 summarizes Unisys' position on alliances, and Exhibit UNI-10 indicates some of the alliances that INPUT believes are or have been undertaken by Unisys on a repeat basis.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT UNI-9

UNISYS STRATEGY—ALLIANCES

- Few formal long-term alliances
- Largely selected on project needs
- Utilizes competitive products/services as required
- Leverages alliance experience in federal arena

EXHIBIT UNI-10

UNISYS STRATEGIC ALLIANCES

Product	Company
Software integration/ manufacturing	DRAVO Auto Sciences
MAP protocol communications	Industrial Networking
Financial/administrative software	Customized Information Systems
Financial/accounting software	Management Sciences America
Decision support software	EXECUCOM
Terminal cluster/controllers	Air Land Systems
Communications hardware	Paradyne
Communications hardware	General Datacom

© 1988 by INPUT. Reproduction Prohibited.

Based on Unisys' experience in networking, reservations systems, and federal government systems integration, INPUT believes there are considerable resident skills to perform the majority of likely CSI activities. For those activities that require outside resources, Unisys should have minimal difficulty in developing the necessary relationships.

10. SI Capabilities Summary

INPUT's evaluation of Unisys' capabilities is high. The primary weak spots appear to be in business consulting, and these can be overcome by judicious use of alliances and utilization of industry strength from the various "lines of business" organizations supporting its traditional business. In addition to the general capabilities discussed above, Unisys has a number of unique capabilities that support entry into its desired market niches, including:

- Industry-specific software for finance, manufacturing, communications, and the public sector
- Connectivity products, including network processors, timeplexing systems, and software products to support SNA, NET, and OSI
- Proprietary and alliance-provided network management products to support a variety of network architectures
- A substantial installed base, particularly in the minicomputer market

11. SI Marketing Strategy

Unisys has embarked on a line-of-business marketing strategy that it is leveraging into the commercial SI marketplace. (See Exhibit UNI-2.) One of the difficulties that Unisys will have is having is finding qualified prospects to whom to sell SI solutions. Unisys currently uses its field sales force to find the opportunities. In both the federal and commercial SI markets, Unisys responds to RFPs and proactively develops prospects.

- Competitors: Unisys sees itself competing primarily against IBM, EDS, and Andersen Consulting, the latter primarily in the commercial market. In addition, Unisys believes that AT&T is likely to become a more formidable competitor in the near future. CSC is also a key competitor in the federal environment.
- Positioning: While there are variations between how the federal and commercial sides of house present themselves to prospects and clients, there is a certain amount of consistency. Worldwide service and support, substantial resources, full-service supplier capabilities, and compatible product architecture are promoted by both the commercial and

© 1988 by INPUT. Reproduction Prohibited.

the federal organizations. In addition, the commercial side emphasizes its vertical market expertise, and the federal, its experience in the federal marketplace.

- Promotion: Unisys deploys virtually all methods of promotion on both sides of the business. Public seminars, direct mail, and advertising, both in general business publications and industry or trade publications, are used. However, like most other SI vendors, they find word of mouth and client referrals to be the most effective way of developing new prospects. It is interesting to note that in the commercial environment, Unisys has undertaken two avenues of promotion which it finds extremely effective—"boardroom-level" seminars and the development and implementation of specific programs to educate and utilize outside consultants.

A summary of Unisys' marketing approach is contained in Exhibit UNI-11.

EXHIBIT UNI-11

UNISYS MARKETING STRATEGY

- Selling/prospecting through field sales
- Leverage federal government experience
- Vertical market focus for commercial marketplace
- Primary competitors: Andersen Consulting, IBM, AT&T, EDS
- Positioning: full service, full solution
- Promotion: full range, referral effective

12. SI Customer Base/Specific Projects

Unisys' commercial SI organization reports that it obtains about 75% of its contracts from the existing customer base and the remainder from new accounts. Interestingly, the federal organization reports the exact opposite split. Both organizations, however, report that they believe the business to be profitable.

© 1988 by INPUT. Reproduction Prohibited.

While Unisys was reluctant to discuss the specific number of contracts currently underway or accomplished over the past two years, the commercial organization did provide several examples of recent projects:

- United HealthCare: To keep pace with the rapidly changing healthcare industry, United HealthCare needed a system that would enable the company and its clients to achieve maximum benefits from its large patient care data base. Moreover, it wanted to join with a strong computer systems partner in order to insure an adequate system for the future. With Unisys providing program management and development expertise, United HealthCare is upgrading is current hardware to an A17J and developing and implementing a new healthcare maintenance applications system.

- Frederick & Nelson: Purchased from Marshall Field and Company, Frederick & Nelson, a Northwest U.S. department store chain, needed to create a complete data processing facility from scratch, then migrate its current computer applications from Marshall Field's system to its new mainframe. Unisys' solution was a complete package, providing program management to combine hardware, custom software, customer services, facilities management, and operations management. The project was completed in June of 1988, ahead of schedule.

- NASDAQ (National Association of Securities Dealers Automated Quotations): Unisys' solution to providing an automated quotation system included its own Distribution Communications Processors which linked the NASDAQ broker terminal network to the Unisys 1100 systems at NASDAQ's Connecticut facility via HYPERchannel products supplied by Network Systems Corporation. The resulting network opens the market to more investors and eliminates former limitations to trading.

  In upgrading NASDAQ's network architecture, Unisys redesigned the network, developed custom software to allow the various mainframe systems and communications processors to communicate via the HYPERchannel network, and provided network redundancy to support disaster recover.

Additional SI projects undertaken by Unisys are summarized in Exhibit UNI-12:

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT UNI-12

UNISYS SI PROJECT EXAMPLES

Company	SI Project
Ontario Hydro	Monitoring and control system
Nationwide Insurance	Agency automation for marketing complete line of insurance products
State of Washington	Social service applications
Macdermid	Manufacturing resource planning
Sunnen	Manufacturing CIM system

13. Summary and Future Directions

Although Unisys is a relative newcomer in the commercial SI arena, it has years of successful experience in the federal marketplace. It has considerable resources in-house to launch a successful attack on both markets and has organized to approach the market directly. As more commercial projects are completed, Unisys' portfolio of reference accounts should help it obtain a substantial footing in the marketplace. In addition there appears to be a commitment to the business that starts at the top of the organization. INPUT believes that Unisys is a solid competitor.

INPUT believes that the market will see Unisys take a more aggressive approach over the next 12 to 18 months. Marketing has been significantly strengthened, and recent reorganizations will align resources on the commercial side to mount the necessary promotional campaigns to overcome any weaknesses in the current offering.

INPUT also believes that Unisys may take a more focused approach on network and other infrastructure opportunities, in addition to pursuing its established vertical markets.

© 1988 by INPUT. Reproduction Prohibited.

B

Andersen Consulting

1. Key Contacts

George Shaheen
Managing Partner
Andersen Consulting
69 West Washington Street
Chicago, IL 60602

2. Description of Principal Business

Arthur Andersen & Company (AA), organized as a partnership, is one of the "Big Eight" public accounting firms. In addition to offering worldwide accounting/auditing/tax services to client firms, AA offers through Andersen Consulting (AC), formerly the Management Information Consulting Division, related services including:

- General Management Consulting
- Information Systems Consulting
- Packaged Applications Software for Accounting
- Packaged Software for Vertical Markets
- Integrated Solutions to Business Needs
- Organizational Change Management Services

Arthur Andersen has offered management consulting services since 1948 and information services related consulting since the early 1950s. By INPUT's estimates, Andersen Consulting derives approximately 40% of its total revenue from consulting services (INPUT estimates $1.1 billion worldwide in 1988). This segment of the business, with a growth rate of over 30% per year for the last three years, is rapidly becoming the dominant influence on the firm's future strategy.

Of the total revenue stream attributed to Andersen Consulting, approximately 55% can be attributed to pure professional services contracts, 40% from systems integration, and the remaining 5% to applications and systems software products. INPUT's estimate of the detailed breakout is contained in Exhibit AC-1.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AC-1

KEY PARAMETERS OF ANDERSEN CONSULTING'S CONSULTING/SI BUSINESS

Parameter	U.S.	Total
IS practice revenues	$632 M	$1,100 M
IS practice personnel	7,200	15,300
Systems integration revenues	$383 M	Unknown
Systems integration practice personnel*	4,400	Unknown

*Calculated by INPUT.

Arthur Andersen has been one of the most phenomenal knowledge-related businesses of the last 20 years. Revered at one moment by its competitors in the information services marketplace, and not taken seriously at others, the consulting operation has consistently shown significant growth rates and defeated the competition on a regular basis. Its commitment to the information services market has resulted in significant developments over the past several years.

In the 1986-1987 time period, a number of senior consulting partners approached Duane Kulberg, AA's former CEO, to lobby for a change in the structure of the firm that would facilitate the growth of the consulting side of the business. They argued that the traditional "partnership" structure with practice office accountability was inappropriate to a business with an increasing national and international focus. The result was the organizational change that created Andersen Consulting.

In 1987, the consulting partners in local offices began to report through a parallel line of management of area and national consulting partners. At a national level, the consulting practice still reported to the Arthur Andersen practice head in that country—more often than not, with a background of audit. At the same time, a strengthened dotted-line relationship was created between the country consulting heads (or area consulting heads in the U.S.) and the Consulting Managing Partner in Chicago. This move has strengthened the consulting practice significantly.

© 1988 by INPUT. Reproduction Prohibited.

3. Andersen Consulting Competitive Position

Number one among the "Big Eight," AA is the largest public accounting firm in the U.S. Its estimated $632 million revenue in IS consulting makes Andersen Consulting the leader among accounting/auditing/consulting firms in this segment.

Andersen Consulting's strengths include contacts at the vice-presidential or presidential level at customer companies. In fact, each IS partner is expected to be able to contact senior officers at their top accounts. In addition, Andersen Consulting offers extensive in-house staff training and has a strong services-oriented culture. Grinding no ax with regard to hardware, AC has developed a variety of strong third-party relationships to support it in its information services consulting business.

INPUT does not believe that AC has any significant weaknesses. However, some problems do exist. First, AC's partnership culture has traditionally worked against change. However, recent developments within the organization are likely to minimize the effect of this problem. Second, AC's approach to systems integration has been heavily business-process-oriented. Top down in nature, the approach is not suitable for every client. Finally, AC's strengths in the international component of the IS/SI market have significantly lagged the U.S. operation's. However, AC is rapidly building these capabilities. Exhibit AC-2 summarizes INPUT's assessment of competitive strengths and weaknesses as they apply to the systems integration business.

EXHIBIT AC-2

ANDERSEN CONSULTING'S COMPETITIVE STATUS

Strengths	Weaknesses
High-level client contacts	Partnership culture
In-house training capability	Process orientation
"Professional services culture"	Lagging foreign capabilities
Strong third-party relationships	

© 1988 by INPUT. Reproduction Prohibited.

4. Markets Served

Andersen Consulting's systems integration business focuses almost exclusively on vertical markets, but in effect covers almost all of the commercial sectors including:

- State and Local Government
- Manufacturing
- Wholesale and Retail Distribution
- Financial Services
- Healthcare
- Insurance
- Utilities
- Process Manufacturing
- Transportation
- Telecommunications

Although AC has clearly demonstrated capability in all the markets listed, from a historical perspective INPUT believes that AC's primary focus in these vertical industries in order of importance has been: manufacturing, distribution, state and local government, financial services, and telecommunications.

Furthermore, although many competitors consider Andersen Consulting "invisible" in the federal SI marketplace, AC has recently placed significant emphasis on developing business in that arena. Most likely, the "invisibility" is more a function of the types of systems they do (primarily administrative) as opposed to the more-publicized defense contracts.

5. Recent Events

A number of significant events have impacted Andersen Consulting's position in the SI market over the past three years.

- AC has placed significant emphasis on the development of alliances in the software community, including: UCCEL/CAI, Management Science America (MSA), McCormack & Dodge, IBM, and SAP (West German cross-industry financial packages).

- On the hardware side, alliances have been formed with IBM, Intel, DEC, and Hewlett Packard (HP). In February of 1988, AC and Aetna Life & Casualty signed a joint development and marketing pact for investment accounting software running on DEC/VAX hardware.

- AC has also focused on the development and aggressive marketing of its own software products including: FOUNDATION (Software Development Utility), DCS/Logistics (Distribution Control System), FIN-PAC (Financial Planning & Control), and the "MAC" line of integrated manufacturing software packages.

© 1988 by INPUT. Reproduction Prohibited.

- Andersen Consulting also has developed a number of relationships with preferred installers that provide vertical industry software which AC customizes and includes in SI projects.

But perhaps the most significant developments for Andersen Consulting have been in the ongoing saga of its restructuring to support the information services and systems integration marketplaces. As discussed earlier (Section 2), the formation of Andersen consulting represented an important change in the firm's posturing of the Consulting/IS/SI business. Developments in the organizational area are still in process.

The developments have not been painless. During 1988, several senior partners departed AC to form another firm, Information Consulting Group, financed by Saatchi and Saatchi. It appears that they are developing their own competitive line of business, and although legally at arms length from Saatchi, they can certainly rely on adequate funding to pursue that venture.

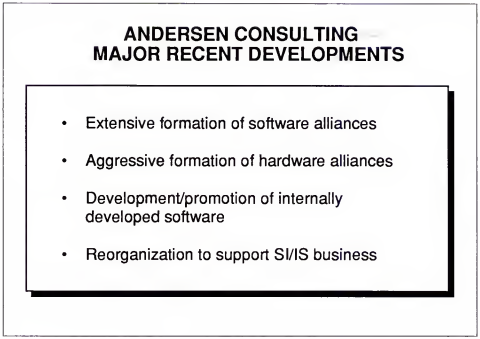
Whether stimulated by the events described above or not, major changes are currently underway within Andersen Consulting. At this January's meeting of over 2,000 Arthur Andersen partners, the process of restructuring the business has most likely taken the next step. Although AC would not comment directly on what happened at the January meeting, INPUT believes that result will in effect reverse the dotted lines, creating an entirely separate consulting structure, with local U.S. and international IS practice personnel (approximately 15,300) reporting directly through a chain of command to Chicago. If this turns out to be the case, other changes are likely to follow including:

- A restructuring of compensation and other plans
- A possible reorganization of the remainder of the business along similar lines
- An increased focus and consistency of strategy in SI markets
- Increased access to capital for investment

Exhibit AC-3 summarizes major recent events impacting Andersen Consulting's position in the SI marketplace.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AC-3


ANDERSEN CONSULTING
MAJOR RECENT DEVELOPMENTS
• Extensive formation of software alliances
• Aggressive formation of hardware alliances
• Development/promotion of internally developed software
• Reorganization to support SI/IS business

6. SI Organization

As described in Section 2, the overall organization to support systems integration activities is in a state of change. However, the actual delivery of services as it exists today operates in a matrixed structure. Based on INPUT's interviews with Andersen Consulting, responsibilities are distributed in accordance with Exhibit AC-4, which compares how major responsibilities are managed within the commercial and federal organizations, respectively. A "**C**" indicates that the responsibility for the activity in question is primarily centralized, a "**D**" decentralized, and a "**B**" indicates that the responsibility is shared by both.

Centralized groups handle marketing, bid preparation, risk management, insurance, national contract purchasing, and other activities. Local offices provide the sales emphasis and many of the technical professionals necessary for systems integration projects. Andersen Consulting operates five Advanced Systems Centers worldwide (three in the U.S.), which are used for the development of client applications. Associated with the Advanced Systems Centers are Technology Centers which specialize in industry and function-specific technologies. The Systems Integration Center in Evanston, IL handles all CIM (computer-integrated manufacturing) and JIT (just-in-time) manufacturing project implementations. Other Technology Centers provide industry expertise as needed for particular projects.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AC-4

CENTRALIZATION/DECENTRALIZATION OF SI BUSINESS FUNCTION ANDERSEN CONSULTING

Responsibilities	Commercial	Federal
Strategy and long range planning	C	C
Marketing and promotion	C	C
Account management/sales	D	D
Contract review/approval	B	C
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operations (if applicable)	D	D

C = Centralized, D = Decentralized, B = Both

Andersen Consulting reports a full-time worldwide IS practice staff of 15,300. INPUT estimates that 4,400 people of the 7,200 individuals involved directly in the U.S. information systems consulting practice are directly involved in the SI practice. This number is based on the percentage of 1988 U.S. systems integration revenues. Exhibit AC-5 gives an indication of the distribution of resources between various SI-related activities.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AC-5

DISTRIBUTION OF SI BUSINESS PERSONNEL ANDERSEN CONSULTING

Capability	Percent
Management, strategy, planning, marketing	1
Legal/contract administration, finance	1
Project management and administration	5
Design/development/implementation	83
Hardware/software evaluation/acquisition	5
Hardware engineering	1
Sales	4

7. SI Business Objectives

Andersen Consulting wants to gain and maintain position by being the pre-eminent provider of solutions to "top" organizations worldwide. The focus is strictly on partnering to provide solutions. Although not explicitly stated in the interview process, INPUT believes that a Andersen Consulting sees itself as taking leadership as the "respected consultant/provider of strategic information systems."

From a business perspective, Andersen Consulting sees the revenue and profits from systems integration as a primary motivator for development of the business, along with control of account base and the need to respond effectively to existing and new customer demand. As would be expected, "dragging" hardware and follow-on facilities management contracts are not of primary interest.

© 1988 by INPUT. Reproduction Prohibited.

8. SI Capabilities Evaluation

And as might be expected, Andersen Consulting has a full in-house capability at the high end of the development life cycle, and also as might be expected, makes heavy use of alliances in the areas of systems software, hardware, custom and communications hardware, and hardware maintenance. A summary of its capabilities follows:

- Business Consulting, Design, Project Management - Clearly this is the area of Andersen Consulting's strength. The combination of a solid methodology along with uniform and effective training of its personnel produces consistent, if not always exceptional results. Consistent with the professional services orientation of the firm, education, training, and documentation are also significant skills that it brings and markets heavily as part of their capabilities.

  It is interesting to note, but not surprising, that Andersen Consulting indicated that it uses no alliances in these capability areas.

- Packaged Applications Software - This is clearly an area of strength for AC. It has made significant investments in the development of numerous packages. (See Section 5 and Exhibit AC-6.) The aggressive marketing of these packages, along with the development and utilization of strong alliances to fill the gaps, gives Andersen Consulting perhaps the strongest position within its competitive group in the applications software area.

- Systems Software/Computer and Communications Hardware - This is an area where Andersen Consulting consistently utilizes other vendors' products, most often through alliances. They want to be perceived, and most likely are, unbiased in their selection of hardware and systems software.

- Network Management/Operations - Although AC does have some contracts where it performs these functions, this area is neither a primary focus of their business nor an area of strength. Again, AC uses alliances for this function when possible or appropriate.

INPUT believes that overall, Andersen Consulting has significant capabilities in the areas that count for winning and executing SI contracts. Its focus on the top end of the life cycle and perceived strengths in understanding business solutions gives it an edge on the market that few others have, and in many industry sectors as well.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AC-6

ANDERSEN CONSULTING
APPLICATIONS SOFTWARE PRODUCTS
SOME EXAMPLES

Product	Description
MAC-PAC/CIM	MRP-II product linking plant automation and manufacturing software. Several other MAC-PAC packages run within this series for specialized applications such as defense contracting.
DCS/Logistics	Manages customer service and logistics functions.
CQMS	Cost Quality Management System integrates clinical and financial data in the hospital environment.
FOUNDATION	A comprehensive set of packages to manage the systems life cycle, which includes submodules METHOD/1, DESIGN/1, and INSTALL/1.

9. SI Strategic Alliances

Andersen Consulting has established some significant alliances that strengthen the firm's SI capabilities. As with most other major systems integrators, AC utilizes both long-term and project-by-project alliances. AC believes that the use of alliances supports its strategy for SI by:

- Providing hardware at competitive prices
- Giving it early access to new technologies
- Providing assistance in financing projects
- Supplementing areas where it has limited internal capability, such as maintenance support

© 1988 by INPUT. Reproduction Prohibited.

The majority of its longer-term alliances have evolved from working with particular subcontractors or partners on a repetitive basis. Others have developed as a result of Andersen's strategy to develop industry-specific software.

The alliances with hardware manufacturers—Hewlett-Packard, for distribution and marketing applications, and IBM—effectively support AC's thrust into financial and manufacturing markets. AC has begun to work with DEC as well. (Exhibit AC-7 provides examples of AC's strategic alliances in systems integration.

EXHIBIT AC-7

ANDERSEN CONSULTING
SI STRATEGIC ALLIANCES
(Limited Sample)

Product	Description
Hardware	IBM Hewlett-Packard Intel DEC
Applications Software	UCCEL/CAI MSA McCormack & Dodge SAP (Financial)
Systems Software	IBM AION (Expert Systems)
Cooperative Marketing	Aetna (Insurance)

10. SI Capabilities Summary

Andersen Consulting's strengths far outweigh its weaknesses as a systems integrator. In fact, its strong set of capabilities in the high end of the life cycle serves to reduce significantly its dependencies on outside suppliers for the high-risk elements of most SI contracts. Its strengths in

© 1988 by INPUT. Reproduction Prohibited.

software development, project management, and packaged systems and applications software have contributed measurably to the firm's success. The weaknesses in service and repair and, to some degree, the design integration part of the spectrum, are non-critical to success in the business, particularly in the vertical markets where Andersen Consulting has focused.

AC's suite of alliances and applications software offerings also add significantly to its overall capabilities. AC's MAC-PAC/CIM (Integrated Manufacturing) and DCS (Distribution Control System) are good examples of the latter. And, the FOUNDATION development and implementation methodology is probably the best-known package of its type in the industry.

Finally, Andersen Consulting has always placed heavy emphasis on training. Utilizing its internal training and development capabilities, Andersen Consulting has adopted a strategy of providing consistent development to its staff. Therefore, AC professional personnel understand the processes used in acquiring and executing the business and can be deployed in the organization when and where needed. The resulting consistency from understanding the approach facilitates the effective deployment of personnel in SI efforts and is a great asset.

11. SI Marketing Strategy

The backbone of Andersen Consulting's marketing approach is its vertical business focus and business process orientation (See Section 4). The process is targeted at developing high-level business solutions and converting them into the application of information technology. AC was one of the first, and clearly is one of the most successful, systems integrators to approach the "strategic systems" market. The AC "process" is at the heart of each project. AC understands the value of developing relationships with high-level managers in target firms and industries and very effectively utilizes referral selling at these levels. AC's demonstrated capability to deal with projects over $50 million makes it one of a few commercial systems integrators that can make that claim.

In addition, as part of its marketing process, AC has developed and utilizes five Advanced Systems Centers which feature its product offerings. The Evanston, IL center for CIM and JIT manufacturing environments could be considered a "showcase" example. INPUT believes that more of these centers are in process and that they have proven to be very effective in marketing to systems integration prospects.

- Competitors: Andersen Consulting sees IBM and EDS as its prime competitors. In the federal marketplace, it adds CSC to that list. As AC broadens its targets to smaller systems opportunities, it will undoubtedly find a few more competitors lurking in the wings.

© 1988 by INPUT. Reproduction Prohibited.

- Positioning: AC's primary positioning with customers/prospects is to promote its ability to apply technology to effect change. AC uses this consistent theme in combination with its in-depth vertical industry expertise to posture itself as the number one seller of business solutions. AC has invested heavily in recent years in developing its technological expertise. While this is still not a primary positioning point, it certainly plays a role when presenting the entire package to the customer. INPUT believes these capabilities will become more significant in the future.

- Promotion: Andersen Consulting uses essentially all forms of promotion for its SI market strategy. It has recently begun to utilize network television. However, AC indicates that the jury is out on all approaches except qualified client referrals, direct marketing, and utilization of the Integration Technology Centers, which they rate as highly effective. In addition, AC utilizes public seminars with some degree of success.

Finally, INPUT believes that Andersen Consulting enjoys a somewhat unique marketing position among leading systems integrators that is worthy of comment. AC frequently "writes" the RFP, at least in the figurative sense. AC's business consulting skills often give it entry to the prospect's environment long before a solution or at times the problem, has been defined. Operating from a high-level position as consultant and supported by a methodology, FOUNDATION, AC has often closed the business before it has been opened. As a full-service provider, AC is a logical selection for implementor once the consulting is done. Exhibit AC-8 summarizes Andersen Consulting's marketing strategy.

EXHIBIT AC-8

ANDERSEN CONSULTING MARKETING STRATEGY

- Direct marketing/business processes
- Strong methodology
- Vertical market focus for commercial marketplace
- Primary competitors: IBM, EDS, CSC
- Positioning: strategic systems, business expertise
- Promotion: referral, technology centers

© 1988 by INPUT. Reproduction Prohibited.

12. SI Customer Base/Specific Projects

Andersen Consulting reports that about 80% of its commercial systems integration clients come from its existing account base and about 20% from new prospects specifically solicited for SI. In the federal marketplace, the split is 50% from each source. Undoubtedly the high percentage of repeat business in commercial market reflects AC's long-term account relationships with larger firms, while the 50/50 split in federal is indicative of its more recent entry into that marketplace and the fact that the federal market is more RFP-driven. In both markets, AC claims that its business has been profitable.

In more recent years, AC has moved from a position of mainly pursuing very large projects to soliciting smaller ones as well. INPUT estimates that AC wins almost 60% of the projects it actively bids on; and it has completed projects ranging from $2 million to $80 million (average size about $10 million). AC's top commercial customers are concentrated in discrete and process manufacturing, telecommunications, state and local government, banking and insurance, and the federal government.

Although Andersen Consulting did not provide a list of specific projects, Exhibit AC-9 contains information on some of AC's key SI engagements.

13. Summary and Future Directions

Andersen Consulting has an excellent overall image as a systems integrator. Strengths include its ability to manage the client's planning process, the resources to handle very large projects, and the focus on professional services. Its ongoing investments in key applications software products and the continued development and education of its professional staff will continue to build the positive momentum it has in the marketplace.

Not to be overlooked on the positive side is AC's ability to formulate client requirements. Focusing on the "high end" of the life cycle, AC frequently "writes" the RFP, so to speak—a position that many of its competitors should envy. The result is a very high success rate in winning contracts, which minimizes marketing and bid preparation costs.

In those areas where Andersen Consulting might be perceived as being weak, there are plans in place.

- The inherent problem with the decentralized partnership profit center structure is being addressed by the recent round of reorganizations.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AC-9

EXAMPLES OF ANDERSEN CONSULTING'S SI CONTRACTS

Company or Industry	Project Description	$ Millions
Lockheed	Computer-aided layout/fabrication	3.0
Ashland Chemical	Order entry/ inventory control	5.5
Ca. Dept./ Development Services	Cost recovery system	3.6
Social Security Administration	Integrated administrative and financial system	12.0
Electronics Industry	Circuit Board Test and Assembly	52.0
Utility Industry	On-line billing system	30.0
Retail Industry	Finance, inventory, and sales	10.0

- The "by the book" (perceived by some as overly structured) approach to design and engineering is fading as higher-level and better-trained consultants enter the SI practice.
- A weak technical image is being overcome by a heavy investment in proprietary technology.

The future looks bright for Andersen Consulting. INPUT expects its market approach to become more aggressive as the reorganization of the consulting activity falls into place. INPUT anticipates increased focus on Europe and Asia. In addition, the market can anticipate further heavy investments by AC in technology to support both vertical and to a lesser extent cross-industry markets.

© 1988 by INPUT. Reproduction Prohibited.

C

International Business Machines (IBM)

1. Key SI Contacts

Ned C. Lautenbach
Assistant Group Executive, Application Solutions
U.S. Marketing & Services Group
1133 Westchester Avenue
White Plains, NY

Gerald W. Ebker
President, Systems Integration Division
U.S. Marketing & Services Group
6600 Rockledge Drive
Bethesda, MD 20817

Stephen A. Carns
Vice President, Professional Services
Systems Integration Division
472 Wheelers Farm Road
Milford, CT 06460

Gordon E. Myers
Vice President, Complex Systems Development
Systems Integration Division
2277 Research Blvd.
Rockville, MD 20850

Dennie M. Welsh
Vice President, Federal Systems
Systems Integration Division
6600 Rockledge Drive
Bethesda, MD 20817

2. Description of Principal Business

IBM is the world's largest vendor of computer hardware and related software and services. The company is known more for its marketing strength and customer support than technical leadership. IBM has the broadest product line of any supplier and serves virtually all vertical markets. IBM 1988 worldwide revenues and after tax profits were $59.7 billion and $5.8 billion respectively.

© 1988 by INPUT. Reproduction Prohibited.

3. IBM Competitive Position

IBM has the broadest set of competitive capabilities in the market. It controls over 50% of the domestic computer market (70% for mainframes) and has an enormous worldwide installed base. The company is able to apply large resources to priority efforts such as hardware and software products, customer solutions, and systems integration. In addition, IBM has on-site presence in most of its major customer's data centers.

The last few years have been difficult for IBM as its growth has slowed dramatically. In a number of areas it has been slow to respond to customer needs and it has lost market share to smaller more focused competitors. In addition to this, the mainframe business, that normally provides 40% of IBM's revenue and 50% of its profits, has slowed significantly. In a marketplace that is increasingly more interested in buying solutions, IBM finds its instinct more "product sale" oriented and the products have not been well integrated to meet customer requirements for connectivity and user-oriented solutions.

4. Markets Served

IBM's Federal Systems organization has participated in the systems integration business for 32 years. IBM's commercial marketing strategy has been to provide hardware and software products to all vertical markets. IBM appears to be prepared through its Systems Integration Division, which has now participated in commercial SI for five years, to offer systems integration services to all vertical markets as well.

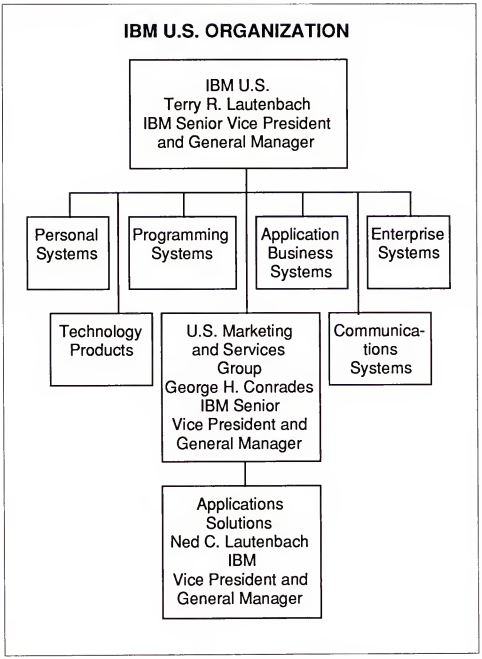
5. Recent Events

In the last year IBM has reorganized in an attempt to become less bureaucratic and more responsive. The three major geographic organizations: IBM U.S.; IBM Europe/Middle East/Africa (E/ME/A); and IBM Asia Pacific Group (APG) were given more autonomy and decision-making authority, previously reserved to the Corporate Office. IBM U.S. retained worldwide product development leadership responsibility through its six product and technology Lines of Business. Exhibit IBM-1 illustrates the IBM U.S. organization that consists of the six lines of business and IBM U.S. Marketing and Service.

In early 1988 the Applications Solutions Line of Business (AS) was also formed within IBM U.S. under Ned Lautenbach, General Manager and IBM Vice President, with a mission to identify and develop total application solutions to satisfy both vertical industry and cross industry requirements, worldwide. These solutions will include applications software products as well as IBM's more traditional hardware and systems software product offerings.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT IBM-1



IBM continues to develop strategic alliances, on almost a daily basis, across a broad range of technologies and vertical markets. Vertical market software examples include co-marketing rights to Lockheed's CADAM system and Hogan's banking software family.

During 1988, IBM continued to reduce its direct participation in the non-data processing related telecommunications business. In the last year IBM sold its remaining interest in MCI and more recently IBM reached an agreement to sell its Rolm telephony product to Siemens.

© 1988 by INPUT. Reproduction Prohibited.

In the midst of these events, IBM's strategy seems to be focused on strengthening its basic information processing business by providing a complete set of application solutions to meet all industries requirements. Systems integration is a key element of this strategy.

6. SI Organization (Exhibit IBM-2)

Applications Solutions (AS) is the focal point for providing total solutions and systems integration services within IBM. When originally established in early 1988, it brought together the ISG Industry Marketing organization, the Federal Systems Division, the IBM Information Network, the Systems Integration and Professional Services business unit, and the Application Software Division. (The IBM Information Network was moved from AS in early 1989.)

Since its inception, IBM has continued to adjust AS to increase its focus on identifying, developing, and providing total application solutions. The Industry Marketing organization, now strengthened, has become the cornerstone of this strategy. When AS was formed, a single assistant general manager was responsible for industry marketing support and vertical- and cross-industry solution identification and development. Today, there are three IBM vice presidents and general managers, each focused at a set of industries or sector. The three sectors are industrial, services, and general and public. Each sector general manager focuses on the applications solutions required by the industries within his or her sector and provides industry consulting to the field marketing organization and its customers.

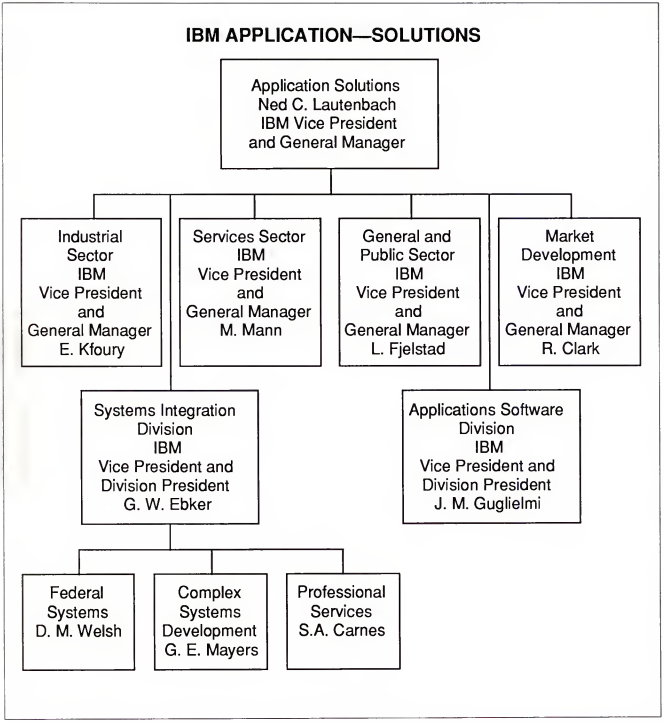
The sectors have also been strengthened by adding unique industry or sector unique capabilities that were formerly in other IBM organizations. For example, functions from the Charlotte Laboratory and consumer terminal development and manufacturing areas, formerly in the Information Products Division, have been added to the services sector, and parts of the Endicott Lab and Application Software Division CIM products organization folded into the Industrial Sector Organization.

Finally, a fourth IBM vice president is responsible for identifying and implementing solutions that have cross-industry applications.

An extremely important observation needs to be made at this point. IBM, traditionally driven by its product divisions, has recognized the need to be solutions driven. The sector general managers, described above, are IBM vice presidents, similar to the product division presidents. IBM clearly wants to make itself more market driven. But by making the solution identifiers/developers and product developers equals, IBM hopes to break its traditional product-driven orientation.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT IBM-2



© 1988 by INPUT. Reproduction Prohibited.

The Systems Integration Division organization has also been changed to become more responsive to field marketing and customer requirements. In early 1988, Systems Integration and Professional Services (SI&PS), the professional services business unit, was added to the Federal Systems Division (FSD) which was renamed the Systems Integration Division (SID) under President Gerald W. Ebker, former President of FSD. SID now consists of Professional Services (between 1,000 and 1,500 employees) performing tactical professional services and systems integration in branch locations throughout the U.S.; Complex Systems Development (approximately 1,000 employees) has responsibility for strategic solution development for the general and public sector and cross-industry applications; and Federal Systems (between 10,000 and 12,000 employees) has responsibility for Department of Defense business, federal systems integration for all federal agencies, and strategic solution development for the service and industrial sectors. Exhibit IBM-3 is a summary of IBM's SI personnel resources.

EXHIBIT IBM-3

IBM STAFFING FOR THE SI BUSINESS

Market	Staff
Federal	4,100
Commercial	3,000

IBM's marketing strategy is still based on a single IBM customer contact, the field marketing representative, who has customer satisfaction responsibility. This strategy applies to systems integration where the marketing representative identifies the customer need, handles it locally, if possible, through branch or IBM Marketing Assistance Partner resources, or contacts the AS Sector organization for assistance to identify an integrator.

The AS Sectors have functions designated to assist field marketing in identifying the best systems integrators within their sectors. These organizations have identified and authorized non-IBM commercial systems integrators who are specialists and have known expertise and/or application software products in their sector and industries. If there is no

© 1988 by INPUT. Reproduction Prohibited.

authorized integrator that meets the requirements of the current SI opportunity, or if IBM believes its internal integrator is better qualified to satisfy the requirement, the sector calls on IBM's internal systems integrator, the Systems Integration Division. Most opportunities that are addressed by SID are handled by the professional services unit which has its own small branch marketing force that works jointly with field marketing to develop and close a mutually marketed IBM proposal.

7. SI Objectives and Revenue

INPUT estimates that IBM's total SI revenues were $850 million in 1988 and are distributed between commercial and federal as indicated in Exhibit IBM-4. INPUT believes that these revenues are growing at 20% to 30% and that both commercial and federal SI are profitable.

EXHIBIT IBM-4

IBM SYSTEMS INTEGRATION REVENUES, 1988

Market	$ Millions
Federal	450
Commercial	400
Total	850

SID also performs some non-U.S. projects and has provided personnel and education to accelerate the non-U.S. units' entry into the SI business. The revenues from these activities are not included above.

IBM has the longest and most extensive company experience in systems integration. The Federal Systems Division had performed large complex systems integration programs for 32 years. This experience has become the cornerstone for IBM's new business strategy.

IBM's strategy has always been to establish and maintain account control. Its size and ability to set "standards" meant that customers had to remain close to the IBM product line. But IBM has not always had the right product at the right time, and often the products provided weren't

© 1988 by INPUT. Reproduction Prohibited.

designed or the software wasn't available to make them work well together. Customers were often frustrated and angered by this approach and competitors made serious inroads into IBM's customer base. Systems integration is expected to provide IBM with a solution to this dilemma.

Outside of the federal government, IBM has shied away from installing systems that made use of other vendors products, even though these products filled holes in IBM's product lines. SI, both in concept and in implementation, is a means for IBM to regain control and develop a stronger software and hardware revenue stream.

SI also gives IBM a vehicle for meeting customers' objections to a single-vendor environment. By offering the products and services of other vendors as required in some SI projects, IBM expects to regain the account control position it previously enjoyed.

The closeness of the SI vendor to the customer also insures that the IBM Application Solution organization has a source of market intelligence on emerging requirements. The residual application and industry experience will give IBM a strong sense of what the customer wants and needs. The company expects to turn this experience into the vertical-industry and cross-industry products that it can replicate across a broad range of customers. Some products will be off-the-shelf and others will require tailoring and offer the opportunity for professional services implementation revenues as well. This strategy could also result in IBM becoming a much larger player in the turnkey market where it enjoys limited participation today.

8. Internal SI Capabilities Evaluation

INPUT has examined and evaluated IBM's SI capabilities as described below.

- Business Consulting - IBM's consulting capability is strongest in technology areas and weaker in vertical-industry applications. The company is making a conscious effort to strengthen the latter, by focusing on application areas that can leverage its limited experience. One disadvantage IBM has as a consultant is its perceived lack of solution objectivity, and this is most likely true.

- Design Methodology - IBM does not appear to have developed a unique design methodology for the commercial market, but rather relies on a limited group of highly skilled systems architects for each SI engagement.

© 1988 by INPUT. Reproduction Prohibited.

- Design and Integration - SID developed effective software, systems engineering, and integration and test skills in its federal integration contracts. The division is transferring these skills to the commercial SI organizations. It is not yet clear, however, that these skills are directly transferable particularly in an environment where the field marketing organization calls on SID at the eleventh hour and when the requirements definition job and project specification is often incomplete.

- Project Management - This area is one of IBM's biggest challenges. Historically, it has solved some problems with brute strength rather than skills. The company cannot apply this approach in very large commercial SI contracts, many of which are "mission critical," for important customers that expect solutions "on time/within budget." Like other federal integrators, SID will need to use its stringent federal program management disciplines but modify them to be more flexible and responsive to commercial customer requirements. SID has recognized this need and made many of the required changes.

- Software Development - While IBM has strong systems software development skills, its applications development software skills seem very average. These skills are improving, however, through experience gained by teaming with more experienced vendors such as CTG and AMS.

- Education, Training and Documentation - IBM has extensive and highly respected capabilities in these areas that are easily transferred to SI projects. IBM's success in leveraging federal SI expertise into commercial markets will rely a great deal on education and training programs. These programs not only are important within SID, but are critical in ensuring that the customer and field marketing are in tune with SID's capabilities and plans. IBM trains and educates across the broadest range of topics and provides the greatest geographic coverage of any vendor.

- Packaged Application Software - IBM's application program products are generally considered to be limited in scope and weak in performance. The Marketing Assistance Program (MAP) is an effort to sponsor more and better applications for customers. In most of IBM systems integration engagements today vertical industry software is provided through IBM alliances or by teammates. Systems integration also offers new products for IBM through jointly developed products with customers who have a need for application of new technology. A good example of joint development is the USAA image program. SID, as the integrator, managed the integration of an image solution for USAA, which resulted in a new product, Image PLUS, for IBM's software portfolio.

© 1988 by INPUT. Reproduction Prohibited.

- Packaged Systems Software - Systems software is one of IBM's major strengths. There are few practical alternatives to the industry standards IBM has established in the mainframe area with MVS, CICS, IMS, and DB2. IBM offers effective systems software programs on its smaller systems, however it still needs to solve all of the inter-operability and connectivity issues among minicomputers, microcomputers, and mainframes.

- Standard Computer Hardware - Computer hardware is another major area of IBM strength. IBM is the world leader in terms of the breadth and depth of its product line. This advantage is slipping away, however, as highly focused companies such as Apple, SUN, and Tandem often produce superior products, while IBM's hardware offerings often suffer from lack of compatibility and poor connectivity. IBM will almost always bid its own hardware. The exceptions to this are limited to areas where IBM lacks specialized hardware components, where IBM doesn't have a product, where its product doesn't meet specifications, or where the customer has specified another vendor's equipment.

  SID contains a complimentary products organization that negotiates with other computer industry vendors to add non-IBM products to the IBM sales manual. This is used in cases where IBM does not have a product that is required by the IBM customer set. These products can carry either the IBM or other vendor's logo.

- Custom Computer Hardware - SID also has a custom hardware development organization. It develops products to satisfy weaknesses in the product line. These products usually are industry-unique terminals and terminal modifications and the systems and applications software modifications required to include them in an IBM systems solution.

- Communications Hardware - IBM offers a limited series of communications controllers, modems, multiplexors, and diagnostic units. Through Rolm it gained a set of superior telephony products although, as mentioned earlier, it has sold the development and manufacturing of these products to Siemens.

- Network Management and Operations - To date, IBM has avoided direct participation in facilities management, although it will team with, or subcontract to, a firm that has facilities management expertise. It recognizes the importance of network management and provides a network management tool, NetView. Although IBM recognizes that networks and network management play an important role in systems integration, it is not clear to what degree IBM will participate in direct network and facilities management.

© 1988 by INPUT. Reproduction Prohibited.

- Service and Repair - IBM possesses outstanding internal strengths in service and repair. Capabilities include wide geographic coverage, an efficient parts distribution and support network, second- and third-level support personnel in branches, remote diagnostic centers, and a problem/solution/fix status data base called RETAIN.

- Software Maintenance - IBM has an outstanding software maintenance capability that contains most of the same support elements as hardware support, described above. At this time, maintenance is limited, however, to IBM software products.

9. SI Strategic Alliances

IBM has hundreds of alliances with marketing assistance partners (MAPs), system integrators, and other partners. In the commercial SI arena, since 1986, IBM has established strong relationships with a number of integrators. As a team, IBM supplies the hardware and the teammate supplies the integration services. These integrators are generally identified by the different industry marketing organizations within the Sectors, and selection is based on their industry knowledge, application expertise, end-user relationships, project management skills, and prior SI experience. SI partners value this teaming arrangement since it exposes them to IBM's new technology and provides them with the lowest possible IBM product prices for the bid. IBM has formed alliances with integrators from: the Big 8 accounting firms, the RBOCs, professional services companies, and aerospace companies. A representative sample of IBM SI teammates are listed in Exhibit IBM-5.

10. SI Capabilities Summary

IBM has skills in all of INPUT's 14 capabilities categories. Some are strong such as the broad and strong product line while others such as business consulting are relatively weak.

The company has excellent technical skills, the broadest geographic coverage of any vendor, a strong federal SI background and a full range of alliances with excellent teammates and subcontractors.

Vertical industry capabilities in most industries remain an area that IBM needs to improve in terms of its level of expertise and products and solution offerings. While alliances seem to be satisfying much of this demand, IBM is probably creating and strengthening a group of vendors it will eventually compete against as it improves its own industry skills and products. Exhibit IBM-6 summarizes INPUT's assessment of IBM's SI capabilities.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT IBM-5

IBM STRATEGIC PARTNERS IN SYSTEMS INTEGRATION

- American Management Systems (AMS)
- Electronic Data Systems (EDS)
- Andersen Consulting
- Coopers & Lybrand
- Computer Sciences Corporation (CSC)
- Computer Task Group (CTG)
- SHL Systemhouse
- Policy Management Systems
- Boeing Computer Services (BCS)
- Martin Marietta Data Systems

EXHIBIT IBM-6

INPUT'S EVALUATION OF IBM'S SI CAPABILITIES

Strengths	Weaknesses
Hardware and systems software products	Solution consulting objectivity
In-house technical skills	Business consulting skills
Geographic coverage	Vertical market solutions
Federal experience	
Alliances	

© 1988 by INPUT. Reproduction Prohibited.

11. SI Marketing Strategy

a. Customer Benefits Promoted

IBM sells its prospective client the following benefits: Avoiding hiring peaks and the need for advanced technology skills for large projects; gaining the latest state-of-the-art technology; increased probability of project success; return on investment; and predetermined cost and schedule.

b. Application Targets

As indicated in the earlier discussion on IBM's organization, IBM is trying to provide applications for all vertical industries as well as cross-industry applications. Its strategy is to team with integrators that have known capability in the different vertical markets while building its own application knowledge and software portfolio. The company's internal integrator, SID, focuses on those areas that lack a preferred teammate or represent a strategically important opportunity. The SID development organizations focus on developing new solutions, where IBM recognizes that its lack of software solutions is impacting its hardware business, and/or where the solution can ultimately be replicated across a large number of customers.

c. Industry Targets

As indicated earlier, IBM's strategy will affect most industries as it strives to satisfy the broadest of customer bases.

d. Advanced Technology Centers

Another key IBM marketing strategy is the use of advanced technology. Within SID, advanced technology centers have been established to pursue technologies such as artificial intelligence and imaging. This capability enables the marketing force to showcase technologies that it believes its customers want to buy. IBM recognizes that its advanced technology capabilities are much stronger than its business consulting skills. Rather than focusing on the front-end work of identifying the need and recommending business change, vis-a-vis Andersen Consulting, its strategy is focused on applying the latest in technological capability.

e. Promotional Strategy

IBM has employed little, if any, advertising in the SI arena. Most of its promotion is through seminars and direct marketing.

© 1988 by INPUT. Reproduction Prohibited.

12. SI Customer Base

IBM did not disclose the number of SI contracts it is engaged in or has completed. INPUT believes that IBM has been involved in over 200 SI projects with prices that range from less than $100,000 to several hundred million dollars. On the federal side, they have been awarded the $3.5 billion dollar FAA Advanced Automation contract. While IBM did not disclose its customers to INPUT, some of its programs that have received broad publicity are identified in Exhibit IBM-7.

EXHIBIT IBM-7

IBM SI PROJECT EXAMPLES

Company	SI Project
AMADEUS	Airlines reservation system
Ford Motor Company	Plant automation-truck instrument panels/office automation
NC Board of Education	Administrative network
V.P.I.	Local network
Federal Aviation Admin.	Advanced administrative system
WESPAC	Fourth-generation banking system
USAA Insurance Co.	Image-based folder management system

13. Summary SI Evaluation

a. Capabilities

IBM possesses impressive strengths that can not be overlooked.

- IBM has an immense customer base from which most SI opportunities will emerge. On a worldwide basis it includes the largest companies in each industry. IBM is virtually assured to be among the first to know of these opportunities.

© 1988 by INPUT. Reproduction Prohibited.

- IBM has a virtually unlimited capacity to address mega-opportunities. Smaller companies may be unwilling to assume the risk or be required to sign performance bonds or underwrite risk insurance to compete. IBM is in a position of great financial strength.

- IBM has a strong base of internal systems integration skills.

- IBM's ability to invest in SI is tremendous. The ability to invest in developing replicable solutions may prove critical in the SI market. IBM has established the organization and resources to accomplish this.

- With its broad and widely accepted product line, large customer base and immense investments in technology, IBM has the ability to attract a broad range of third parties that are willing to be partners, teammates, and subcontractors. IBM has literally hundreds of these alliances in place today.

b. Possible Weaknesses

IBM has several areas of weakness, although it is aware of most of its limitations and is taking action to correct them.

- IBM's broad product line in many areas suffers from incompatibility and lack of connectivity. This is one of the major reasons that IBM originally established a SI capability. Solving this problem will result in a stronger product line but, at the same time, eliminate some of the need for systems integration.

- IBM has traditionally had a very distinct preoccupation with hardware products. It has yet to be proven that its new organization can reverse this preoccupation. IBM is still more comfortable applying technology to known problems, rather than identifying the underlying business problems and then designing a solution that addresses them.

- The marketing organization must learn and accept a new direction and set of skills. Its traditional orientation emphasizes the sale of products, not solutions. Marketing is accustomed to giving away internal IBM development capabilities through joint development activities, rather than marketing them as business offerings. It is also used to immediate results based on product shipments, not long-term returns based on lengthy program development and implementation cycles. IBM will need to examine and set its marketing incentives to insure that the sales force is alligned with the SI thrust.

© 1988 by INPUT. Reproduction Prohibited.

- While IBM appears to have a large base of SI talent in SID, the opportunities may quickly outstrip its abilities to address them. The large base of partners that it is promoting as the best solution providers today, may capture market niches and gain customer control in areas where IBM would like to ultimately compete.

- It is clear that prospects for SI are looking for industry knowledge and application expertise. IBM, because of its broad customer base is attempting to develop expertise in all industries. It is questionable if IBM, regardless of its size and resources, can attract the talent required to achieve this ambitious goal in the near term.

- IBM will most likely never be a price leader in SI. The immense support structure and overhead that it has developed through the years, and is now trying to reduce, as well as its desire for high margins, will give it less flexibility than many of its competitors.

14. Future IBM Directions in SI

IBM has clearly recognized the need to be market driven and to develop and market solutions rather than products. This major transition will continue as long as IBM sees this as the only option in maintaining its market position. While pieces of this strategy may stumble, the thrust is expected to continue.

INPUT believes that IBM will develop major education programs for its field marketing and customers to help them understand the benefits of SI.

IBM will continue to focus on developing replicable solutions to leverage its development investment and reduce the skill requirements and risk associated with one-of-a-kind SI engagements. INPUT also believes that IBM will begin to focus more on internal training and tools to improve the productivity of its personnel. It will also look for new tools and methodologies to reduce risk and differentiate it from its competition.

© 1988 by INPUT. Reproduction Prohibited.

D

Digital Equipment Corporation (DEC)

1. Key SI Contacts

Mr. Don K. Busiek
Vice President
Systems Integration & Professional Services
Maynard, MA

2. Description of Principal Business

Digital Equipment Corporation ("DEC" or "Digital") designs, manufactures, markets, and services general purpose midrange computers, intelligent workstations, terminals, related peripherals, systems software, and applications software for cross-industry and selected vertical markets. Additional DEC-provided services include:

- Computer services (facilities management, disaster recovery, hardware rentals)
- Professional services (network planning and implementation, site planning, education, training, and systems integration)
- Financial services (principally leasing)
- Reference books, handbooks, software guides, and application software sources
- Custom hardware and software

Based on total 1988 revenues ($12.3 billion with a net profit of $1.21 billion), DEC is the second largest vendor in the computer industry. Consistent growth in product sales over the past five years reflects DEC's successful strategy of mixing distributed processing systems with mainframe computers (mostly IBM), and capitalizing on IBM's perceived weaknesses in connectivity and midrange capability.

Without question, Digital holds the leadership position in midrange systems. Over the past five years it has capitalized on its strengths in departmental and distributed computing, enabling it to expand beyond its traditional emphasis on scientific and technical computing to include the general office and administrative applications. Although DEC operates in virtually all industry sectors, primary industry markets for DEC include: telecommunications, education, federal government, aerospace, automobile manufacturing, banking and finance, health care, and process manufacturing.

© 1988 by INPUT. Reproduction Prohibited.

DEC has been in both the federal and commercial systems integration business for over fifteen years. Only recently (Fall of 1988) did the company elect to "package" its SI product. The official "coming out" was embodied in the announcement of Enterprise Services (ES).

DEC would not provide revenue figures for its SI business. However, based on INPUT's analysis, DEC's SI revenues for 1988 were $140 million. The breakdown is summarized in Exhibit DEC-1.

EXHIBIT DEC-1

DEC SYSTEMS INTEGRATION REVENUES, 1988

Business Component	$ Millions
Federal	40
Commercial	100

3. Company Competitive Position

In addition to the company's general financial health, DEC's primary competitive advantage is its integrated computer architecture, which permits modular expansion of its systems and software compatibility across hardware/software platforms. In addition, DEC benefits from an extensive library of third-party and in-house developed applications software and the growing use of its equipment in general purpose departmental environments. Additional advantages include:

- An acceptable integrated office automation offering in the form of All-In-One
- The recent addition of a line of intelligent workstations offering connectivity and compatibility with the existing product line
- Sound fiscal management and an enthusiastic user community

© 1988 by INPUT. Reproduction Prohibited.

On the other side of the coin, there are some weaknesses. DEC's initial failure and current re-entry into the microcomputer environment will make it an uphill battle to regain position in the desk-top market. Furthermore, while the top end of the VAX line's raw capability approaches that of a true mainframe, the storage and software capabilities available hardly make the VAX competitive with the IBM 3090 class machines for certain types of large business applications.

Certain business relationships have also proved troublesome for DEC. As DEC has pursued more of the participation in being in the software and distribution markets, it has had to readjust its relationships with its distribution channels. VARs, VADs, authorized distributors, and dealers are watching with some level of concern as DEC restructures its relationships in these areas. Unless DEC handles these transitions well, it could find itself in a position of biting the hand that feeds it.

4. Markets Served

Digital's primary targets in the systems integration market are vertical. The following targets were cited during the interview process:

- Finance
- Manufacturing
- Federal & State Government
- Public Industries
- Telecommunications

The primary motivation for these markets is the existing customer demand. INPUT can expect that the range of industries serviced will grow as DEC sees opportunity or loss of account control in any particular industry. In addition to the markets cited by DEC during the interview, it appears that DEC has and will continue to take a strong position in engineering & scientific, artificial intelligence/expert systems, and office automation cross-industry sectors for both SI and non-SI opportunities. Exhibit DEC-2 summarizes DEC's primary SI market opportunities.

5. Recent Events

The most significant recent event is DEC's official entry into the SI marketplace. The timing of the entry to some extent had a "me too" effect on the market, but officially squelched any doubts that DEC was going to participate. Behind the scenes a number of events have occurred that will support DEC's entry and success in the SI marketplace.

- In late 1987 DEC announced strategic affiliation with British Telecom, Northern Telecom, Ericsson Telephone Company, Philips Telecommunications, and Siemens which will strengthen its position in the communications component of the SI business.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT DEC-2

DEC'S SI TARGET MARKET OPPORTUNITIES

Vertical	Cross Industry
Finance	Office Automation
Manufacturing	Artificial Intelligence
Federal & State Government	Engineering & Scientific
Public Industries	

- In January of 1988, DEC and Apple declared a joint venture that has subsequently provided a solid architecture linking their respective products.
- Over the past two years, DEC has invested significant amounts in hiring experienced consultants and professional services personnel from the "Big 8" and other professional services companies whose primary business has been in the "solution" selling and delivery businesses.
- Over the past several months DEC made a blitz of product announcements that support its position as a systems integrator. The most significant announcement was the introduction of a line of desk-top workstations and component products that will support a wide variety of imaging applications.
- In March 1989, DEC won its largest systems integration contract for automation of a Boeing sheet metal fabrications facility.

Overall, DEC has been positioning itself to participate more fully in the SI market for several years. Traditionally perceived of as a hardware manufacturer catering to the scientific and engineering markets, DEC currently now has a diverse professional staff of 40,000 worldwide. Although DEC would not comment on the specific size of the professional staff dedicated to Enterprise Services, INPUT believes it to be in the range of 1% of the total complement of 110,000, or about 1,100. Even if this estimate is wrong, it's quite clear that the organization is able to sustain and develop a significant professional services organization to support its position in systems integration.

© 1988 by INPUT. Reproduction Prohibited.

6. SI Organization

The primary thrust for both the federal and commercial side of the Enterprise Services offering is Don Busiek. Organization of the SI activities is highly matrixed, as would be expected of an organization like DEC. The overall division of responsibilities for SI is summarized in Exhibit DEC-3. A "C" indicates that the responsibility for the activity in question is primarily centralized, a "D" indicates decentralized, and a "B" indicates the responsibility is shared by both.

EXHIBIT DEC-3

CENTRALIZATION/DECENTRALIZATION OF SI BUSINESS FUNCTION DIGITAL EQUIPMENT

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	C
Marketing and promotion	C	C
Account management/ sales	D	D
Contract review/approval	B	B
Project management/ control	B	B
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operations	D	D

C = Centralized, D = Decentralized, B = Both

© 1988 by INPUT. Reproduction Prohibited.

7. SI Business Objectives

Common to other traditional hardware vendors, DEC sees systems integration as a required response to customer demands. A second primary objective is to utilize SI as a method of strengthening its non-SI business. DEC also cited the penetration of new accounts through solution selling as a critical underpinning of its thrust in SI. Although not explicitly stated by DEC, INPUT believes that DEC sees and will actively leverage the opportunity to use SI as a means of linking DEC with non-DEC computers through its strength in networking, thus increasing the hardware "drag" which can result from systems integration contracts.

It is interesting to note that DEC cited neither account control nor potential profit from the professional services components of SI as primary factors. INPUT does not believe that it is currently interested in the potential of follow-on systems operating or facilities management contracts, a growing part of the SI business. However, DEC has established a product called Support Integration Services drawing upon its field service experience to provide post-contract support for multivendor environments.

8. SI Capabilities Evaluation

Digital offers the full range of SI services. Consulting, design/integration, project management, hardware, communications products, system software, etc. In particular, DEC has a wide range of specific telecommunications-oriented SI capabilities. Its strong financial position and growing capability to understand the risk management associated with SI make it a credible competitor. According to its own evaluation, DEC rates itself highly in almost all capability categories. INPUT offers the following observations:

- Business Consulting - At one time a weak area, DEC is investing significantly to increase its capabilities in this field. Its Enterprise Planning & Design Services are focused on enterprise planning and the identification of strategic opportunities. Partners and alliances are used in this area, but DEC continues a campaign to acquire this skill by hiring experienced practitioners to operate both in a marketing and consulting capacity.

- Design Methodology - Although DEC has no commercial product offering in this area, it does have a highly flexible methodology for approaching SI projects from conception to implementation. The methodology is currently supported by automated tools. DEC has numerous computer-based products which if properly packaged could further automate elements of the process. INPUT believes however, that DEC's general aversion to standardized methodologies makes it

© 1988 by INPUT. Reproduction Prohibited.

unlikely that DEC will "productize" this aspect of its SI offering. DEC believes that the flexibility of its methodology is a key selling point that allows them to enter the design and implementation cycle at a variety of levels.

- Design Integration - Regardless of methodology, DEC has established a reputation for being able to integrate its offerings with those of other computer hardware and communications equipment manufacturers. This is one of DEC's real strengths. In addition, the unified nature of DEC's own product architecture is an advantage. Integration at the *network* level is DEC's major strength. The lack of a truly distributed data base product and limited in-house experience with large-scale integration at the applications level puts it no better, and no worse off than traditional SI competitors from the computer hardware business. INPUT expects that DEC will develop in both of these areas.

- Project Management - INPUT believes that DEC has demonstrated strong skills in the project management area. It should be noted however, that to INPUT's knowledge, the majority of DEC's SI projects to date have been in the $3 million to $5 million range where traditional project management approaches stand a reasonable chance of success. DEC has also invested heavily in developing a "program" management approach which should strengthen its capabilities in this area for jobs like the recently won Boeing project.

- Software Development - DEC has extensive (perhaps the most) experience in developing applications software for minicomputers. Even though in-house expertise might be limited in some vertical industry markets, Digital's strong network of alliances and third-party developers has produced a full range of applications for DEC's platforms. It will be interesting to see whether this strength in mini/distributed systems can be leveraged into larger-scale applications involving mainframes and highly demanding on-line transaction processing environments.

- Education, Training, and Documentation - DEC has a highly developed system for education and training, and is probably better than most at being able to deliver this service flexibly.

- Packaged Applications Software - There are hundreds of third-party suppliers that develop software for the DEC environment, and DEC has strengthened, INPUT believes, its ability to create continued interest in developing packages for its platforms. A more subtle issue is whether the emerging suppliers of cooperative processing software packages that share processing between the workstation and mini/mainframe environments will leap on the bandwagon and develop effective packages for DEC's new line of desktop workstations.

© 1988 by INPUT. Reproduction Prohibited.

- Packaged Systems Software - DEC provides a unified set of systems software to operate in its VAX/VMS environment. Its strength in this area may well be equal to IBM's; and it has the additional advantage that the systems software environment operates compatibly across DEC's hardware offerings. This capability combined with full software offerings permitting communications between DEC and non-DEC environments is a real strength.

- Standard Computer Hardware - DEC's integrated VAX/VMS architecture is a major advantage. The only issue is whether DEC will be successful in its efforts to move effectively into the mainframe environment. The recent addition of a complete workstation line should begin to cover the lower end of the spectrum.

- Communications Hardware - DEC offers a line of communications devices primarily targeted at DEC proprietary environments. Other manufacturers provide hardware to complement DEC products, and as already mentioned, DEC provides communications systems software products that allow its platforms to communicate effectively with almost all standard network environments.

- Network Management and Operations - DEC continues to develop effective network management software; the company has experience at managing worldwide networks. The majority of the experience to date has been largely with homogeneous DEC networks. However, INPUT believes that Digital's commitment to communications standards and its growing interest in integration projects will push the company up this learning curve rapidly.

- Service & Repair, Software Maintenance - This is another strength of DEC, but again its experience has been limited in the past largely to DEC-based and standard interface products. DEC has been servicing heterogeneous environments for some time utilizing its Vendor Equipment Services offering. INPUT believes that the emerging Enterprise Services strategy will place additional emphasis on supporting heterogeneous networks.

9. SI Strategic Alliances

Digital uses alliances in virtually all aspects of its systems integration business. The bulk of these alliances are performed within the Service Alliance Program and are negotiated on a supplier by supplier basis. In DEC's own words the program is presented to the customer environment as follows: "Building the best solution for a customer's enterprise-wide project requires many components. Creating and delivering that solution may require the use of third parties."

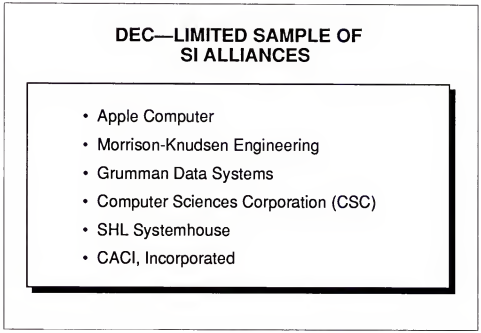
© 1988 by INPUT. Reproduction Prohibited.

The program provides for formal relationships with leading service suppliers in selected technologies, industries, and applications areas; and enhances the breadth, depth, and capacity of Digital's total solution services. It conveys to customers that Digital can be the single source for their company-wide service needs.

Participants in the program may operate on either long-term agreements or be selected on a contract by contract basis. The terms and conditions of participation vary significantly between various program participants.

DEC has successfully used this "partnering" approach for some period of time. Many industry participants consider DEC a leader in the effective use of third parties whether for systems integration or other efforts. DEC clearly is packaging this strength as part of its promotional approach for Enterprise Services. While DEC did not provide a specific list of its partners (which certainly must number in the hundreds), INPUT has listed several key associations in Exhibit DEC-4.

EXHIBIT DEC-4



© 1988 by INPUT. Reproduction Prohibited.

10. SI Capabilities Summary

DEC has a full array of capabilities to compete in the systems integration market place.

Alliances, weakest in the hardware area and strongest in third-party applications software, are a major advantage. Digital has also become more customer oriented over the past several years, shedding its "techie" image and moving more into a solution selling mode. INPUT believes that Digital has improved its project management capabilities and ability to manage risk and deal with larger scale projects.

Vertical industry expertise beyond the scientific/technical areas still needs development. DEC's approach to this problem, as mentioned in Section 5, has been to hire industry consulting expertise from professional service companies, and partnering on key projects to overcome the shortfall. These two strategies coupled with the effective use of industry-oriented third-party software currently help fill the gap.

Exhibit DEC-5 summarizes INPUT's assessment of DEC's SI capabilities.

EXHIBIT DEC-5

INPUT'S EVALUATION OF DEC'S SI CAPABILITIES

Strengths	Weaknesses
Integrated VAX/VMS architecture	Perceived vertical industry expertise
In-house technical expertise	Large project experience
Geographic coverage	
Depth/breadth of alliances	

© 1988 by INPUT. Reproduction Prohibited.

11. SI Marketing Strategy

Digital's marketing strategy is highly focused on target accounts, which are industry based or represent key strategic accounts to the company. The Enterprise Services offering is specifically designed to sell Digital as a full-service solution provider. Additionally, DEC emphasizes its ability to be a partner of the customer in the creation of systems to provide "competitive advantage." While DEC has targeted some specific industry areas (Exhibit DEC-2), INPUT believes that DEC will participate in all industry sectors, particularly in sectors containing key DEC target accounts.

DEC receives extensive support for its Enterprise Services strategy through its 14 nationwide Application Centers for Technology (ACTs). For example, the ACT supporting the aerospace industry is located in southern California, near DEC's customers. The ACT supporting automobile manufacturers is located near primary customers in a suburb of Detroit. These centers will most likely become increasingly important for developing the vertical industry expertise that DEC requires. In addition, DEC has established nine Systems Integration Centers to provide specific support to its Enterprise Services strategy.

- Competitors - DEC will not reference or discuss competition as a matter of policy. It is quite clear however, that it is head to head with IBM on many contracts in both North America and Europe. It would be hard to misinterpret the focus of the "DEC has it now" tagline. While DEC recognizes that its current product line will not likely supplant IBM in the mainframe arena, it has positioned much of its SI marketing and technical product line to be competitive with IBM on SI projects.

  Other competitors include, EDS, Andersen Consulting, and CSC. Interestingly, Digital is more likely to partner with an organization like SHL Systemhouse that has complementary capabilities and little product overlap.

- Positioning - Digital positions itself as the leading worldwide provider of network computer systems and services by offering a full range of computing solutions for integrating the entire enterprise from the desktop to the data center. It leverages its use of alliances much more effectively than many of its competitors.

- Promotion - DEC utilizes all forms of promotion with the exception of direct mail and television advertising in the marketing of systems integration services. Clearly, the company feels that the most effective promotional device is the referral. DEC uses its internal worldwide network of more than 15,000 nodes and 70,000 terminals to validate its

© 1988 by INPUT. Reproduction Prohibited.

experience in networking. Other references include: CIM applications; on-line library data base networks; banking and insurance distributed processing systems; and large-scale health care systems integration projects.

The actual sale of SI projects is largely a field effort. Like other hardware manufacturers, DEC field representatives are compensated on the basis of new business generated. SI represents a lucrative opportunity for the opening of new accounts and the growth of existing ones.

Finally, DEC maintains a responsive consultants' liaison department to positively influence independent consultants hired by companies to recommend project bidders.

12. SI Customer Base

INPUT estimates that DEC has completed 150 to 200 SI projects over the past several years ranging in value from $0.1 million to $20 million. As indicated earlier, the average value of these projects is probably significantly less than those of Andersen Consulting, EDS, or IBM; and is likely in the range of $2.0 million. Projects have encompassed applications ranging from computer-integrated manufacturing (CIM) to inventory management and network integration. Some examples are summarized in Exhibit DEC-6.

EXHIBIT DEC-6

EXAMPLES OF DEC'S SI PROJECTS

Company/ Industry	Project Description	$ Millions
Firestone	CIM	21.0
Honeywell	Paperless factory	10.0
Bantam Doubleday	Network integration	3.0
Boeing	Sheet metal plant automation	52.0

© 1988 by INPUT. Reproduction Prohibited.

Note that the most recent win, Boeing Sheet Metal is by far its largest SI contract and demonstrates DEC's willingness and ability to address large opportunities.

Additional projects have been performed for Toys R Us, Boeing, the Zurich Stock Exchange, the Paris Stock Exchange, and Honeywell.

13. Summary and Future Directions

DEC's strengths include its ability to manage projects involving distributed processing, networking, and communications across various vendors' processors. Network design and management capabilities are crucial to being a successful integrator and DEC scores high in this area. Additional strengths include:

- Communications hardware and software products that enable DEC hardware to communicate with non-DEC computers
- Strong account presence through its worldwide service staff
- A recently declared "formal" marketing position in SI in the form of Enterprise Services
- The financial strength, internal technical skills, and growing capability to manage larger-scale projects and the associated financial risks
- A rich portfolio of internally developed and third-party applications software product offerings

On the negative side, DEC has a few weaknesses as well:

- A perceived lack of objectivity in approaching the hardware component issues of the solution
- And, in INPUT's opinion, the lack of a strong central organizational structure to direct and establish this emerging business

INPUT believes that DEC will move toward a separate but decentralized organizational structure for administration, sales, and marketing of SI activities. In addition INPUT anticipates that DEC will continue to target large-scale, international, and publicly visible SI projects to establish a reputation for its Enterprise Services offering, and initiate more aggressive education of internal field personnel to help promote the SI strategy.

All in all, Digital's opportunities in SI look bright.

© 1988 by INPUT. Reproduction Prohibited.

E

American Telephone & Telegraph Company (AT&T)

1. Key SI Contacts

Mr. A. C. Stark, Jr.
Vice President
Integrated Communications Systems
Room 17-S266D2
295 North Maple Avenue
Basking Ridge, NJ 07920

Mr. Nicholas Toeroek
District Manager
Systems Integration Planning
Room C02-34B03
55 Corporate Drive
Bridgewater, NJ 08807

2. Description of Principal Business

AT&T is the leading domestic provider of telecommunications services and equipment. In 1988 revenues reached $35.2 billion. AT&T operates the largest network and manufactures and distributes telephone switching equipment. In addition, through various operating groups, AT&T sells and leases voice and data business equipment.

AT&T provides a wide variety of international network services, including network services to foreign administrations and national organizations. In its traditional lines of business AT&T has superior technical capability and provides services to virtually all vertical markets. The company has long been considered an innovator in basic research, baseline computer, and telephony technology.

3. Competitive Position (Exhibit AT&T-1)

AT&T is the largest seller of switched telecommunications services with more than 67% (down from 80% five years ago) of the domestic market. With a staff of more than 300,000, AT&T is the strongest provider of national services. Although under federal regulation, AT&T provides a wide range of services through unregulated subsidiaries. AT&T remains the major provider of central office switching equipment, but is experiencing increasing competition from companies such as Northern Telecom and Fujitsu.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AT&T-1

AT&T'S COMPETITIVE POSITION

Strengths	Weaknesses
Market share/customer base	Regulatory control
Technical expertise	Internal bureaucracy
Perceived quality (products/service)	Strong competition
Strong research capability	Narrow focus

The company has extensive expertise and is the perceived leader, among its competitors, in service quality in the areas of telecommunications networks and equipment. Much of the quality is a result of extensive research that AT&T has applied to the development of field products and service management over the years.

AT&T's competitive weaknesses can be directly related to two significant factors. First, the traditional services that AT&T provides are subject to regulatory approval. Requests for new services or changes in pricing must be submitted for approval by the FCC (Federal Communications Commission). The regulatory process permits competitors to have advance knowledge about pricing and service offerings and the right to object to provisions that they believe are anticompetitive.

In addition to the regulatory process, AT&T has been battling with its internal bureaucracy, a legacy of its monopolistic days, in an effort to be responsive to changing opportunities and markets.

These two factors coupled with an increasing level of competition in its traditional business have placed significant pressures on financial performance and the ability to roll out new strategies. Reflecting these pressures, revenues declined slightly in 1986 and 1987, but re-bounded in 1988 to their highest level since divestiture. On the positive side net income has shown some increases, reflecting well on AT&T's ability to

© 1988 by INPUT. Reproduction Prohibited.

deal with its rapidly changing position in the market. Though it could have reported a $2.26 billion after-tax profit in 1988, the company took a $6.7 billion write-off on old analog equipment, resulting in a $1.7 billion loss. Some of the key factors impacting AT&T subsequent to the 1984 deregulation of the industry include the following:

- AT&T lost its monopoly position for providing end-to-end connectivity. Under deregulation local telephone companies provide connections to the customers' premises; AT&T is finding it increasingly difficult to hold market share in customer premises equipment markets.

- Under regulation AT&T had been prevented from competing in the computer equipment or services business. After deregulation, AT&T was left without the ability or appropriate product offerings to compete effectively with many organizations that are now considered its competitors.

In response to these issues AT&T has taken a number of actions to reposition itself in its traditional markets and open up opportunities in the information services industry, including:

- Forming alliances with hardware manufacturers in order to gain strength in areas where there was no previous requirement to compete. Tandem and Sun Microsystems are two examples.

- Developing partnerships and relationships with numerous organizations to provide the ability to compete in the professional services arena

- Taking aggressive action to reduce staff in its traditional business lines to meet growing price competition from national telecommunications service providers such as MCI and U.S. Sprint

- Entering new markets such as systems integration

AT&T has been providing integrated systems to the federal SI market for over 20 years, and network integration in the commercial arena for at least the last ten. Its entry into the brave new world of computer systems integration is little more than a three year old phenomenon. AT&T did not release separate systems integration revenue results; however, a number of significant contracts were signed last year. (See Section 12.)

© 1988 by INPUT. Reproduction Prohibited.

4. Markets Served

In its traditional business, AT&T is a major player in virtually every vertical industry sector. The systems integration activities to date have focused heavily on AT&T's strong functional capability in communications networks. However, AT&T did identify that its primary vertical focus at the present time and the immediate future is in the following four vertical markets:

- Banking and financial services
- Retail and wholesale distribution
- Manufacturing
- Federal government

AT&T has selected these markets on the basis of not only their size, but the potential that they have for future integration efforts. Furthermore, based on AT&T's participation in the market to date, the company appears to have demonstrated the capability to support these sectors with their existing in-house industry capability.

5. Recent Events

Perhaps the most significant recent events impacting AT&T's position in systems integration have been in the area of strategy formulation and organization.

- As was already mentioned, AT&T has undergone significant staff reductions and reorganizations over the past several years. In the summer of 1988, AT&T created its first organization to support the commercial SI marketplace, creating the Systems Integration Division under the direction of Vice President, Chuck Yates. The organization was housed within the Business Markets Group.

- In October 1988, Chuck Yates publicly unveiled plans to enter the SI business via custom data and voice networks for the commercial marketplace. He indicated that AT&T's initial thrust would be telemarketing, data networking, and network management applications. As reported in the Wall Street Journal, the new division would coordinate its efforts with AT&T's computer, large business, network operations and Bell Labs units to sell, design, and install networks that included custom software, telephone, and computer equipment from AT&T and other vendors.

© 1988 by INPUT. Reproduction Prohibited.

- Most recently, in March 1989, the entire SI organization was further restructured by combining the systems integration division with other network integration groups into a new Integrated Communications Systems Division (ICSD), as part of a larger restructuring of AT&T's entire organization. It's too early to tell whether this will have a significant impact on AT&T's SI strategy.

- On the technical side, AT&T has taken a leadership position in the development of UNIX for the commercial market place. With powerful partners such as Amdahl, Fujitsu, Intel, Motorola, NCR, Sun Microsystems, Unisys, and Olivetti, UNIX is likely to become an increasingly valuable asset in the SI capabilities arsenal. AT&T's leadership should help support its position in the SI market.

6. SI Organization

AT&T's SI organization is highly centralized with matrixed support. This is not surprising considering its relatively new entry into the market, and its strategy of being highly selective about project bidding. This level of centralization is also consistent with the fact that the vast AT&T field organization has little, if any expertise to support the direct marketing and execution of systems integration projects on a localized basis. Exhibit AT&T-2 indicates how responsibilities are organized under the current AT&T SI strategy.

At the present time AT&T has a full-time staff of approximately 300 dedicated to systems integration activities, and estimates that on the average there are approximately 1,000 other staff members operating in the commercial systems integration area. Exhibit AT&T-3 indicates the staff distribution across the various activities associated with SI.

This distribution, with its heavy emphasis on hardware engineering and project management and administration, reflects AT&T's heavy involvement with technology-focused projects.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AT&T-2

CENTRALIZATION/DECENTRALIZATION OF SI BUSINESS FUNCTION AT&T

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	
Marketing and promotion	C	
Account management/ sales	D	
Contract review/approval	C	
Project management/ control	C	
Implementation/development	C	
Hardware/software acquisition	C	
Systems operations	N/A	

C = Centralized, D = Decentralized, B = Both

7. SI Business Objectives

INPUT believes that AT&T's key objectives will be to identify and pursue niche opportunities that make the best use of AT&T's strengths. More specifically, INPUT believes that AT&T will:

- Focus on opportunities and make the best use of its strengths in long-distance network design, implementation, and management

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AT&T-3

DISTRIBUTION OF COMMERCIAL SI PERSONNEL AT&T

Capability	Percent
Management, strategy, planning, marketing	10
Legal/contract administration, finance	3
Project management and administration	20
Design/development/implementation	40
Hardware/software evaluation/acquisition	7
Hardware engineering	10
Sales	10

- Place emphasis on alliances related to specific opportunities. As the major provider of long-distance telecommunications services, AT&T is a logical choice as an ally for other SI vendors to provide the telecommunications component of key contracts.

- Use systems integration as a means of pulling together and marketing its own services. AT&T will develop strategies that focus on providing services such as customized telemarketing solutions that require the combination of computers, custom software, and network services that AT&T already provides.

AT&T sees systems integration as a business opportunity that should improve the profitability of its existing lines of business, and as a means of promoting the sale of its own products and services. In addition, like many other hardware and service providers, AT&T is under increasing pressure from its existing customer base to respond to requirements for integration services. Finally, INPUT sees the provision of systems integration services by AT&T as an opportunity to differentiate itself from its competitors in its increasingly competitive traditional markets.

© 1988 by INPUT. Reproduction Prohibited.

8. SI Capabilities Evaluation

AT&T has exceptionally strong capabilities in areas related to the design, development, and management of large telecommunications networks and is working aggressively to establish strengths in other areas. The following provides a summary of AT&T's capabilities in key areas of systems integration.

- Business Consulting - AT&T has a strong capability in this area when it comes to network development and management. This capability is definitely marketable in niche areas. It has traditionally used alliances to supplement this skill with general business consulting, but will need to significantly strengthen its own capabilities to compete in the general SI market.

- Design/Integration, Project Management - Again the company has significant capability at the network level, but little experience in the area of applications systems design or data integration. The company has been working to establish alliances that would contribute to the development of this area. Its early alliance with EDS, and newer one with CSC are examples in the systems development area.

- Software Development - With the exception of its network exchange software, AT&T has little experience in the development of software applications. This presents a significant weakness.

- Education, Training & Documentation - AT&T has strong skills in training and education in telecommunications. AT&T operates a school for all levels of training for telecommunications professionals. The school is available to the public. It is probably possible to extend this concept to support SI business opportunities, but INPUT is not aware of any extension to date.

- Packaged Applications Software - AT&T has little experience in the development and marketing of packaged applications software. Since deregulation, the company has been working to develop its customer billing and call accounting systems as a packaged product that could be sold to RBOCs and other carriers. However, to date, this set of products has not been very successful.

  AT&T acquired Adelie Corporation, based in Cambridge, MA. Adelie is a software house specializing in mainframe telemarketing applications. This acquisition should play a significant role in AT&T's strategy to retain and grow its telemarketing customer base.

© 1988 by INPUT. Reproduction Prohibited.

- Packaged Systems Software - With the exception of UNIX, AT&T has no significant experience in developing and marketing packaged systems software. For almost any SI project, AT&T must rely on alliance partners to bring this experience and capability.

- Standard Computer Hardware - AT&T's internal experience in the development of general purpose hardware over the past several years has led to significant organizational stress and financial difficulty. INPUT believes that AT&T will continue to have difficulty marketing its own line of general purpose hardware products and will continue to rely on alliances with other manufacturers to provide significant hardware components in its SI bids.

- Communications Hardware - AT&T's communications hardware reputation is extremely strong. INPUT believes that the only weakness in this area involves the fact that AT&T has not been as effective as some other vendors in packaging hardware with software and services to offer a comprehensive set of "solution" products.

- Network Management & Operations - As operator of the nation's largest telecommunications network, AT&T has an established reputation. Whether this credibility can be extended to networks with large (in numbers or size) general purpose computer systems is still somewhat in question. However, INPUT believes network management and operations is a major strength that AT&T brings to the SI client.

- Service & Repair/Software Maintenance - AT&T has extensive experience in the service and repair of telecommunications equipment. AT&T's services can be provided throughout the country. However, AT&T traditionally has only been able to work on AT&T equipment. The ability to be a complete provider of repair services has not been extensively demonstrated. As far as software is concerned, AT&T's capabilities are limited, consistent with the previous comments on its offerings in that area.

9. SI Strategic Alliances

Although AT&T responded that it has no formal alliance program, it utilizes alliances extensively in its systems integration business. The primary motivators for AT&T's use of alliances are to:

- Expand/enhance in-house capabilities
- Seek industry-specific applications/technical expertise
- Enhance the bid team
- Open up specific opportunities

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AT&T-4

AT&T STRATEGIC ALLIANCES

Alliance	Purpose
Tandem	Switch software RBOC marketing
EDS	Joint bids IS hardware capability Software development Project management
Sun Microsystems	Computer hardware UNIX promotion
CSC	Joint bids Network focus

The majority of AT&T's alliances are consummated on a contract-by-contract basis. However, AT&T has developed some longer term relationships with specific companies (Exhibit AT&T-4). A brief discussion of these relationships follows:

- AT&T has established a joint marketing agreement with Tandem Computers. Under the terms of the agreement, AT&T will provide its switch software to operate on Tandem computers. Tandem will market the systems to RBOCs and other organizations.

- The alliance with Tandem is mutually beneficial. The agreement will help AT&T market to the RBOCs and will bring enhanced value to the public (telephone) network when combined with AT&T's 5ESS switch. For Tandem, the alliance provides opportunities for additional hardware sales.

- In 1985 AT&T established a seven-year agreement with EDS. Under the agreement, AT&T and EDS jointly agree to bid on contracts where each can contribute its own expertise. However, the agreement also permits AT&T and EDS to bid on the same projects separately which they did on the $25 billion FTS, federal network contract.

© 1988 by INPUT. Reproduction Prohibited.

The alliance between AT&T and EDS seems to be very complementary. AT&T has a need for strong systems and applications software development expertise as well as experience in the management of large applications projects. EDS has a need for AT&T's strong experience in telecommunications.

INPUT believes that this alliance is not as effective as it was conceived to be. In fact, no joint programs of note have been announced for some time.

- AT&T has established a strong alliance with Sun Microsystems for the development of AT&T's UNIX operating system. In addition to an opportunity to expand the base for the UNIX system, there are indications that Sun may begin to expand into larger systems which would benefit AT&T as well.

- In late 1988 a strategic business relationship with CSC was rumored, but not formally confirmed. This was to be a multiyear joint effort to bid on large-scale commercial systems integration contracts. Regardless as to whether the formal alliance has been consummated, it is clear that the two are allies and have worked on or are working on joint opportunities together. Examples are the U.S. Treasury Network, FTS-2000, and its ongoing proposal to Merrill Lynch.

10. SI Capabilities Summary

Overall, AT&T has a number of significant strengths which should support it well in the specialized SI market niches it is currently pursuing. While it lacks many of the capabilities required to compete against Andersen Consulting and others who are making their mark in vertical applications markets, AT&T will team with these companies to provide an integrated solution to a customer RFP.

AT&T is making great strides in finding complementary organizations with which to partner, and is likely to make more acquisitions to fill some of the holes in its capabilities portfolio.

In addition to general capabilities, size, and coverage, AT&T has a number of unique products or offerings which place it in a desirable partnering position in the SI marketplace, including:

- Industry-specific software for statistical quality control, manufacturing planning and control systems, etc.

- Unique hardware and software products for connectivity; including gateways and routers and MAP software

- Optical storage and retrieval systems for engineering information, etc.

© 1988 by INPUT. Reproduction Prohibited.

11. SI Marketing Strategy

Although AT&T has been organized for the SI market for some time, its marketing strategy is still not clear. However, INPUT believes that AT&T will focus its efforts on the largest accounts with which it has existing relationships resulting from its network activities, and will bring general awareness of its SI capabilities to the commercial market primarily through its national sales force.

AT&T will be opportunistic and selective and will focus on the largest opportunities where it can use its expertise in telecommunications. AT&T will make heavy utilization of partners for both the marketing and delivery of SI projects. It is likely that many of its efforts will be joint bids.

- Competitors - AT&T sees EDS, IBM, and DEC as key competitors in the SI marketplace. Interestingly enough, AT&T partners with two of these competitors (IBM and EDS) and even has an agreement with EDS. (See Section 8)

- Positioning - AT&T is positioned as the world's leading authority on telecommunications services and network management.

- Promotion - AT&T currently uses public seminars and word of mouth as its primary promotional vehicles for SI, and claims that both methods are effective. INPUT anticipates more advertising in the general and trade publications in the near future

12. SI Customer Base

INPUT is aware of three major commercial SI efforts in which AT&T is engaged. They are summarized in Exhibit AT&T-5.

The first is a large statewide-integrated telecommunications network for the state of Wisconsin. The project is valued at approximately $39 million and will result in a fully integrated network serving all departments of the state government.

The second is with Ford Motor Company. Under the terms of the agreement, AT&T is to provide a Virtual Telecommunications Network Service linking Ford plants and offices nationwide. AT&T won the contract over MCI and US Sprint which were also bidding on the contract. However, the contract proved to be difficult for AT&T. AT&T needed to obtain regulatory approval to provide the services that it has agreed to provide. The request for approval has been met with some resistance, and a delayed approval could impact the schedule, cost, or both.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT AT&T-5

EXAMPLES OF AT&T'S SI PROJECTS

Company/ Industry	Project Description	$ Millions
State of Wisconsin	Integrated administration network	39.0
Ford Motor Company	Nationwide voice/ data network	Unknown
General Electric	Proprietary voice/data network	Unknown

The third is with General Electric. As part of the agreement, AT&T will develop a nationwide integrated voice and data network using AT&T proprietary technology. Similar to the Ford situation, regulatory approval is required, and threatens the schedules and/or cost.

13. Summary and Future Directions

AT&T's most significant strengths are its capabilities and technical expertise in telecommunications. Few organizations can match its capabilities in this area. AT&T has extensive resources to meet most needs relating to the design, development, and management of telecommunications services. Complementing these technical skills is a large nationwide customer base. In addition, AT&T is represented throughout the country and has an excellent reputation.

The company, however, is vulnerable in some areas. Its primary weakness is a lack of experience in designing, developing, and implementing applications-oriented computer systems. In other words, AT&T has a short track record in providing computer-based hardware and software solutions.

© 1988 by INPUT. Reproduction Prohibited.

In addition, regulatory control and growing competition present their own set of problems. The effect and duration of the regulatory issue is hard to measure. Competition however, is growing rapidly in systems integration as well as AT&T's traditional lines of businesses. Exhibit AT&T-6 summarizes AT&T's strengths and weaknesses.

EXHIBIT AT&T-6

INPUT'S EVALUATION OF AT&T'S SI CAPABILITIES

Strengths	Weaknesses
Strong telecommunications	Narrow experience base
Extensive resources	Regulatory control
Excellent technical skills	Strong competition
Large customer base	Price restrictions
Geographic presence	Strategic focus

Given these weaknesses and what at the moment appears to be a "fuzzy" strategy in systems integration, AT&T will find it difficult to compete on anything but network integration SI projects in the short term. However, INPUT believes that AT&T can be expected to continue to develop alliances to strengthen areas where it is weak, particularly in computer systems hardware and software. Furthermore, INPUT believes that AT&T will begin to make targeted acquisitions, the regulatory environment permitting.

© 1988 by INPUT. Reproduction Prohibited.

In the long term, AT&T could be a major competitor. It has the financial strength and, once a commitment to bid has been made, it has the resources to compete successfully. In the short term AT&T can be expected to be opportunistic, responding to RFPs that closely match the company's current capabilities.

© 1988 by INPUT. Reproduction Prohibited.

F

Computer Task Group (CTG)

1. Key SI Contacts

Mr. David N. Campbell
Chairman & CEO
800 Delaware Avenue
Buffalo, NY 14209

Mr. Jack Courtney
President
800 Delaware Avenue
Buffalo, NY 14209

Mr. Vince Lamb
President
Scientific Systems Services (SSS)
475 South John Rodes Blvd.
Melbourne, FL 32904

2. Description of Principal Business

Computer Task Group (CTG) is a leading provider of computer-related professional services to the commercial marketplace. CTG designs, builds, implements, and in some cases maintains information systems. The company's services consist of consulting, systems analysis, systems design, systems integration, and programming. Areas of special expertise include; business systems programming, engineering, scientific, process control, and automated software conversions.

CTG makes extensive use of software automation in its professional services contracts. The scope of professional services work performed by CTG ranges from specific, minor tasks of short duration, to large complex tasks that require larger numbers of systems engineers for extended time periods. Typically, CTG's professional staff augments and becomes part of the client's on-site software development team on a specific application or project. However, in recent years CTG has established approximately 20 Software Development Centers to support off-site development and implementation in support of client projects.

In 1988 CTG will report total revenues of $218 million, an increase of approximately 28% over the $170 million reported for 1987. This follows a 19% increase of $27 million in 1987. Overall, CTG has shown double-digit growth rates since the early 1980s, with only occasional downturns in profit.

© 1988 by INPUT. Reproduction Prohibited.

Much of CTG's growth in revenue and geographic coverage can be attributed to acquisitions. There have been at least 14 since 1985. Acquisitions candidates are selected to augment specific skill areas and to gain geographic coverage. The purchase of Scientific Integrated Systems Services for approximately $11 million in January of 1988 was significant in boosting CTG's presence in the systems integration market. The subsidiary, renamed Scientific Systems Services (SSS), specializes in integrated computer systems for manufacturing.

CTG serves both the vertical and cross-industry markets. A summary of its primary focus is contained in Exhibit CTG-1.

EXHIBIT CTG-1

CTG'S PRIMARY MARKET TARGETS

Cross-Industry Markets	Vertical Markets
Business Applications Programs	Banking (All Aspects)
Systems Analysis and Design	Brokerage/Insurance
Process Control	Manufacturing
Software Conversion Services	Telecommunications
Packaged Software Support	Public Utilities

3. Company Competitive Position

CTG is one of the largest providers of professional services to the commercial market in the U.S. Its primary strategy has been to be a customer's single source for systems design and programming support, made possible by a staff of over 2,600 systems engineers.

CTG's internally developed software design and development tools enable it to compete against larger firms for SI projects. CTG is a recognized leader in the systems conversion business and has very strong abilities in the DOS-to-MVS conversion market.

© 1988 by INPUT. Reproduction Prohibited.

CTG targets its services primarily to large manufacturing, industrial automation, financial services, and telecommunications firms with large data processing operations. CTG clients include over 75 of the Fortune 100 companies, and over 80% of the firm's new professional services contracts come from the existing client base. Over 30 of CTG's clients have billings in excess of $1 million with CTG.

CTG will post systems integration revenues for 1988 in excess of $35 million dollars, approximately 16% of the total revenue stream. This represents a seven-fold increase over reported SI revenues of approximately $5 million in 1987. While not in a league with today's major players, this represents a significant revenue stream for a company that only entered the business three years ago. The revenues have been generated on about 15 commercial projects with an average size in excess of $2 million, and CTG anticipates its participation in the market to grow at a rate in excess of 35%.

4. Markets Served

As indicated in Exhibit CTG-1, CTG's general professional services business participates in virtually all significant vertical, and a significant number of cross-industry markets. The current targets for systems integration are somewhat more limited. CTG is focusing on:

- Process manufacturing automation
- Materials handling (cross-industry)
- Communications
- Manufacturing/robotics

CTG's focus in these areas is stimulated by its belief, in addition to being growing market segments for SI, that these areas will permit them to leverage off of its established client base. Although not specifically mentioned by CTG, INPUT believes that these areas are well suited to the strengths of its recently acquired subsidiary, Scientific Systems Services (SSS).

5. Recent Events of Interest

As mentioned previously, CTG has been growing substantially through acquisition. In addition to Scientific Systems Services, CTG has made several other acquisitions since 1986 that will strengthen its position in systems integration.

- CTG acquired Telecommunications Management Corporation in late 1988. This organization has particular expertise in voice networks and network management.

© 1988 by INPUT. Reproduction Prohibited.

- A significant investment was made in Analysts International, Inc. in January of 1987. CTG claims that the deal was primarily for investment purposes.

- Maxima Computer Management Consultants, Inc. was purchased in October 1986, and should give CTG access to the federal government, banks, and additional manufacturers.

- Creative Computing was acquired in August 1986 and should help strengthen CTG's data base and data communications expertise.

Another event that has some importance was the dramatic decrease in profitability which occurred between 1986 and 1987. CTG management states that much of the slowdown is attributed to high levels of non-billable time of the professional staff in foreign operations. CTG also cited an investment of $400,000 in new branch operations in the U.K. as a reason for lower profits.

It appears however, that there has been a significant recovery in 1988 that should allay any fears that there is a fundamental flaw in CTG's market or delivery strategy.

6. SI Organization

CTG operates with a lean corporate and administrative staff with only slightly over 400 of the total staff of approximately 4,000 employees listed as "non-professional." Headquarters provides forecasting, strategy development, and financial management while leaving much of the other administrative responsibility to local branches, which are linked to headquarters via a PC/mainframe information network. CTG currently has over 70 offices.

CTG's Institute for Technical and Management Training in Buffalo provides in-depth training for CTG staff. Thirty technical and 20 marketing and management courses are offered. In addition, all new employees get a six-week course on CTG's Systems Engineering Development Programs. INPUT estimates that over 1,500 employees attend these classes on an annual basis.

The delivery of systems integration services is focused primarily in Scientific Systems Services (SSS) which CTG operates as a subsidiary reporting to Jack Courtney, President of CTG. The revenue of this organization is close to 100% SI. Additional SI work is done by other matrixed units of CTG, such as the Corporate Projects Office (CPO) and other specialty business groups. In general the responsibilities are divided as indicated in Exhibit CTG-2. The only totally centralized function is SI contract approval.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT CTG-2

CENTRALIZATION/DECENTRALIZATION OF SI BUSINESS FUNCTION COMPUTER TASK GROUP

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	N/A
Marketing and promotion	B	N/A
Account management/ sales	D	N/A
Contract review/approval	C	N/A
Project management/ control	B	N/A
Implementation/development	D	N/A
Hardware/software acquisition	D	N/A
Systems operations (if applicable)	D	N/A

C = Centralized, D = Decentralized, B = Both

CTG currently has a full-time commercial SI staff of approximately 250. In addition, it estimates that at any given time there are at least 50 other professionals assigned to SI projects. The breakdown of staff between various skill requirements is typical of systems integration vendors whose primary business has been professional services. This is summarized in Exhibit CTG-3.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT CTG-3

DISTRIBUTION OF SI PERSONNEL
COMPUTER TASK GROUP

Capability	Percent
Management, strategy, planning, marketing	5
Legal/contract administration, finance	2
Project management and administration	5
Design/development/implementation	70
Hardware/software evaluation/acquisition	10
Hardware engineering	3
Sales	5

7. SI Business Objectives

CTG has maintained a consistent strategy of being the customer's single source for design and programming support. This strategy has led the company to the development of broader professional services capabilities, and moved CTG into the position of a "full-service" provider. As a full-service provider and rapidly emerging player in the SI marketplace, CTG has adopted two primary objectives:

- Derive revenue and increased profit margins from the special capabilities provided as a systems integrator
- Respond to existing customer demands for buying complete solutions

CTG recognizes that the key to increasing profit margins is through specialization. By specializing CTG is able to command premium rates for its staff. In essence, systems integration is one of the several professional services specialty areas through which CTG hopes to achieve its profit objectives.

© 1988 by INPUT. Reproduction Prohibited.

8. SI Capabilities Evaluation

CTG's primary strength lies in its professional services capabilities. Over 80% of its staff is college educated, and almost all of the systems engineering staff have skills in data base and communications technologies. By its own evaluation CTG ranks high in business consulting, design integration, project management, and software development. The following presents INPUT's assessment.

- Business Consulting - While not at the level of some of the competition in a broad range of industries, this is a strength for CTG, particularly in manufacturing-related projects.

- Design Methodology/Design Integration - Although CTG does not have a packaged methodology, it has made extensive use of automation to support the design and development process. This is a significant strength.

- Project Management - Again, CTG has utilized technology and training of personnel to develop an effective capability. While the approach is effective, it has not been applied to many very large projects. Given the aggressive approach to the market, this capability will undoubtedly be put to the test in the very near future.

- Software Development - CTG is state of the art in this area. Its use of advanced CASE tools and software development aids may be the best in the industry, and it appears to be making the educational and developmental efforts necessary to maintain that leadership position.

- Education, Training, and Documentation - CTG possesses these capabilities in house and by INPUT's estimate probably is above average in capability. The company's use of automated software development tools should significantly contribute in the documentation area.

- Packaged Applications and Systems Software - CTG offers no packaged applications software to INPUT's knowledge. There are a few vertical markets where the company has experience in this area. Also, SSS undoubtedly brings some products and capabilities from its niche market. However, INPUT believes that this is an area where CTG could use significant strengthening. In the area of systems software, CTG has many important alliances.

- Standard Computer Hardware - CTG has extensive working experience with virtually all lines of IBM and DEC hardware. Other environments with which it has experience include: Honeywell, CDC Cyber, Prime, Data General, Harris, and Hewlett-Packard. In this area it has a strong portfolio to offer.

© 1988 by INPUT. Reproduction Prohibited.

- Communications Hardware - As in the case of computer hardware, CTG relies primarily on alliances and partners in the area of communications. It is INPUT's position that the company does not have the strengths or experience in communications that it has assembled in the computer hardware area.

- Network Management and Operations - Over the past 18 months CTG has been building an internal data communications group to bolster its capabilities in this area. In addition, the acquisition of Telecommunications Management, Inc. in December 1988 will supplement the growing capability in data with voice expertise.

- Service & Repair, Software Maintenance - CTG has virtually no capability in the area of hardware service and repair and relies on alliances in that area when necessary. Obviously the company does provide software maintenance, although this is not a major marketing attribute for it in systems integration.

9. SI Strategic Alliances

CTG recognizes the need to utilize alliances to provide the total solution to the customer and to bolster its general capabilities. It utilizes both long-term agreements and contract-by-contract arrangements to accomplish these objectives. CTG's alliances tend to break down as follows:

- Technology-based alliances tend to be long-term in nature. They result from the need to remain state of the art in the application of particular technology that can be utilized in many client situations.

- Solution-specific alliances tend to be formed on a contract-by-contract basis where the need of a client is unique, and there appears to be no applicability of the need to a larger target market.

The majority of CTG's alliances have been formed with hardware and systems software vendors. The primary hardware alliances are with DEC and IBM; while other vendor alliances provide capabilities in 4GL, expert systems, and relational data base management systems. Noticeably absent are longer term arrangements with communications or applications software suppliers.

A summary of CTG's alliances is contained in Exhibit CTG-4.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT CTG-4

EXAMPLES OF CTG'S KEY ALLIANCES

Hardware	IBM Digital
Systems Software	Cullinet Transform Logic Cortrans Miles Burke Aion Corporation DACOM Relational Technology

10. SI Capabilities Summary

Compared to other systems integration vendors, CTG has developed above average capabilities to participate in the market. This is particularly true in the middle of the systems integration life cycle, overall design through implementation. As mentioned in the SI capabilities evaluation, CTG's strengths are not in front-end business consulting or follow-on maintenance activities. In most areas where there appear to be some weaknesses, CTG has developed effective alliances or is rapidly on its way to building or acquiring an internal capability to meet the need. A good example is in data communications and network management where as little as two years ago, CTG had below average capabilities. The acquisition of Telecommunications Management, Inc. and the internal development of a Data Communications Group are rapidly closing that gap.

Other capabilities that work in CTG's favor as a systems integration vendor include:

- The Institute for Technical Management Training
- The Corporate Projects Office, established in 1985 to address large-scale systems development

© 1988 by INPUT. Reproduction Prohibited.

Finally, CTG's leading-edge use of technology in the design, management, and implementation of systems gives it a competitive advantage that few other integrators from the professional services side can offer.

11. SI Marketing Strategy

CTG carries its philosophy of being a full-service provider into the systems integration marketing effort. While the company clearly does not have all the capabilities to support that position in house, it has made great strides in recent years through acquisitions and alliances to cover the approach successfully.

CTG stresses the importance of delivering a competitive advantage to its customers through the application of technology. It has focused its SI marketing efforts on selected industries and cross-industry markets (See Section 4).

Its large professional services client base and the large number of geographically dispersed offices allow CTG to approach the market on both a proactive and opportunistic basis.

- Responding to needs from existing clients
- Proactively selling SI services through the large number of branches

Other facets of CTG's marketing approach are described below and summarized in Exhibit CTG-5.

- Competitors - As would be expected, CTG sees Andersen Consulting, EDS, Digital Equipment, and Computer Sciences Corporation as major competitors in the systems integration marketplace. It is somewhat surprising that IBM is not on the list. As CTG's reputation in the market grows, it will be competing with the major players in the market.

- Positioning - To its customers, CTG presents itself as an organization that can combine management and consulting skills with proven and extensive implementation capabilities to provide state-of-the-art solutions. It points to its financial track record and portfolio of specialized skills as a key asset in selling contracts.

- Promotion - CTG utilizes public seminars, direct mail, client referrals, and trade shows as key avenues to spread the word about its capabilities in systems integration. To date it has done little or no advertising in general or industry trade publications. The company finds public seminars to be most effective, followed by client referrals and trade shows.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT CTG-5

CTG'S SI MARKETING STRATEGY

- Opportunistic approach
  - Selling through branches
  - Use of corporate project office
- Positioning: full-service provider
  - Selected vertical markets
  - Functional and technical specialities
- Customer benefits
  - Competitive advantage
  - Advanced technology (systems software)
  - Reduced risk (fixed price offerings)
- Focused targets
  - Financial services
  - Industrial automation
  - Telecommunications
  - Systems conversions

Overall, CTG's marketing strategy has been evolving quite rapidly during the past three years. INPUT anticipates an increasing level of proactive selling in its targeted markets during the coming year, as well as an increased emphasis on systems integration as a tool for achieving competitive advantage through the application of technology.

12. SI Customer Base

Only 18 months ago, there would have been a limited number of systems integration customers to talk about. As of this writing, CTG has completed at least 15 SI projects. These clients (mentioned in Section 11) have come from both the existing customer base and newly solicited clients, where CTG seems to be getting about 40% of its SI contracts. Some clients and projects are profiled in Exhibit CTG-6.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT CTG-6

COMPUTER TASK GROUP
SI PROJECT EXAMPLES

Company	SI Project
North Star Steel	Plant-wide support system
Public Service of NM	Power plant monitoring system
Unisys	Air Force weather station support
UPI	New facilities development
Baxtor Travenol	Warehouse automation
Norton	Furnace monitoring system
Cleveland Clinic	Medical management system
USX/Pohang Steel	Data center consolidation

One of the SI projects currently underway within CTG is for the Cleveland Clinic. The project will involve 60 to 70 people to develop an integrated medical management system. The project is in the range of $25 million and will utilize specially licensed or acquired state-of-the-art estimating, planning, and development tools to reduce the overall project risk. This project and the USX/Pohang Steel project are two of the largest undertaken by CTG thus far, and will provide additional insight into CTG's ability to compete in the large project marketplace.

13. Summary and Future Directions

Although CTG does not have the in-house capability to offer the full range of SI services, the company has formidable capabilities and is moving rapidly to cover any areas of weakness.

CTG has a superior set of in-house developed system software tools for project management, software development, and conversions. In addition, the company's broad geographic coverage in the U.S. lessens dependence on the financial climate of a particular industry or region.

© 1988 by INPUT. Reproduction Prohibited.

The large well-trained systems engineering staff is a formidable asset that only the largest players including Andersen Consulting, IBM, DEC, EDS, etc. can match. While finding and developing these individuals is expensive, CTG seems to have put together a strong organization with superior qualities.

CTG's penetration of Fortune 500 firms (leading banks and financial services firms, and top utilities, and telecommunications companies) indicates a solid sales capability and account control mechanism, all for a company that is not widely known and until recently with a limited set of SI capabilities.

Finally, CTG has recognized areas of weakness in its delivery capabilities for SI and is filling them through acquisitions and alliances.

All of these assets support the rapid expansion of CTG's systems integration business. The only areas of weakness appear to be in applications software, where to INPUT's knowledge CTG has few packages and a limited set of alliances.

A second area that will require some work is marketing. Market presence and image are rapidly becoming prerequisites for success in systems integration. While CTG has a strong image as a contract software developer, it will need to pay more attention to making itself known as a systems integrator in the marketplace. INPUT believes that the key will be to build a track record of reference accounts that support the firms strategy.

To be a major player, INPUT believes that CTG should move in several areas:

- It must continue to fill voids in its portfolio of SI capabilities.
- CTG needs to broaden its market focus to include more SI prospects, which means acquiring more vertical-industry expertise at the consulting and applications package levels, and increasing the depth of expertise in markets already served.
- The company also will need to more actively sell SI at the branch level.

Overall, CTG is a player who is likely to be in the majors within a few short years. It is a firm to be watched. Assuming that it can afford to make some of the investments suggested above, the future looks bright.

© 1988 by INPUT. Reproduction Prohibited.

G

Electronic Data Systems (EDS)

1. Key SI Contacts

Gary J. Fernandes
Senior Vice President, International, Commercial and Communications Services Group
Electronic Data Systems

Hank Johnson
Vice President, North American Commercial Group
Electronic Data Systems
Dallas, TX
(214) 604-6000

G. Stuart Reeves
Senior Vice President, Government Systems Group
Electronic Data Systems Corp.

Mr. Theodore Ryan
President, Business Development Division
Electronic Data Systems Corp.
13600 EDS Drive
Herndon, VA 22071
(703) 724-1499

2. Description of Principal Business

Electronic Data Systems (EDS) was originally founded in 1962 by Ross Perot to provide systems operations services to insurance companies, government funded health insurance programs, and financial institutions. Today it provides systems operations, processing services, professional services, and systems integration services to nearly all vertical industries and to the federal government. In addition, EDS may act as a fiscal agent for a client taking full responsibility for data processing as well as other administrative duties such as paying, as well as processing, insurance claims.

EDS is among the leaders in providing systems integration to the federal government and entered the commercial systems integration market in the early 1980s, gaining experience and a substantial lead in this area.

EDS was acquired by General Motors in 1984 and is operated as a wholly owned subsidiary. EDS provides virtually all information processing services to General Motors.

© 1988 by INPUT. Reproduction Prohibited.

3. EDS Competitive Position

EDS is the largest systems operations and processing provider in the world and has worldwide 1988 revenues of $4.84 billion and net income of $384 million. Approximately 59% of EDS's revenues are from captive GM business and the remainder is from systems operations and other professional services for outside clients.

EDS brings a strong set of capabilities and resources to the SI table. Its operational data processing experience, including developing and operating large and small data centers, make it a real "pro" in the efficient and cost-effective use of technology. Its systems operations experience with insurance companies and financial institutions provides it with a reasonable level of applications knowledge of these industries. The assumption of all information systems responsibility for General Motors provides it with real business experience in the manufacturing, retail, distribution, and networking areas. And, its alliance with GM Hughes provides it with aerospace industry knowledge.

The purchase by GM further adds to EDS's strengths. It provides huge financial resources to support bids on the largest opportunities and the buying power of one of the nations largest corporations. This buying power will provide it with other vendor's products at the lowest possible price and the leverage to support its strategy to be the low-cost bidder.

4. Markets Served

EDS's primary business focus is on the following vertical markets:

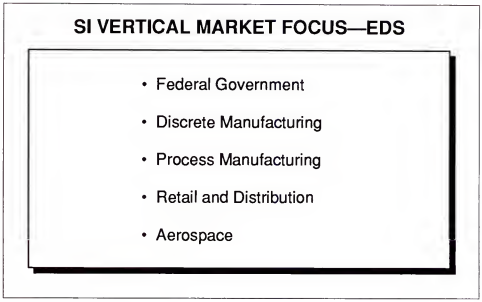
- Federal government
- State and local governments
- Banking and finance
- Insurance
- Manufacturing

While EDS's expertise is aimed primarily at vertical industries, the company has targeted two key cross-industry markets. These markets are engineering and networking, both areas where the company has gained a great deal of experience through its work at G.M.

To become a major systems integrator, EDS has targeted the federal government, discrete and process manufacturing, aerospace, and retail distribution vertical markets. It is also making a major thrust at expanding this capability into the international market. (See Exhibit EDS-1).

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT EDS-1



5. Recent Events

In November 1987, EDS entered an agreement with Tandem Computers to jointly develop and market products and services to help manufacturers connect and integrate multivendor business, engineering, and factory control systems.

During 1987 EDS began negotiations to acquire MTech and the servicing responsibilities for the third-largest ATM (automated teller machine) network in the U.S. The acquisition was completed in 1988. In 1987 EDS also acquired M&SD Corp, a supplier of telecommunications services and equipment.

In late 1988, Perot sold his interests in GM-EDS and resigned from the GM Board of Directors because of fundamental differences he had with GM's management style and system. At that time Perot agreed that he would not compete with EDS for profit for a three-year period.

During 1988 Ross Perot formed a new firm, Perot Systems, focused on systems integration and a direct competitor to EDS, and entered into a sole source, non-profit consulting agreement with the U.S. Postal Service. EDS protested this contract and it was overturned by the Federal Government. EDS and Perot are still in litigation resulting from this bid and Perot's reentry into the systems operations field.

In March 1989, EDS entered into negotiations to purchase 20% ownership of National Advanced Systems (NAS), the other 80% to be held by the Japanese computer manufacturer, Hitachi. This investment should provide EDS with a low-cost source of computer hardware and enhance its strategy to become the low-cost provider of information processing solutions.

© 1988 by INPUT. Reproduction Prohibited.

Recent Developments are summarized in Exhibit EDS-2.

EXHIBIT EDS-2

RECENT MAJOR DEVELOPMENTS

- Tandem CIM alliance
- MTech and M&SD acquisitions
- Perot discord
- NAS acquisition negotiations

6. EDS Organization

In interviews with INPUT, EDS stated that it is in the systems management business and systems integration is an essential component of that business. SI cannot be easily segmented or dissaggregated from systems operations. It also stated that most of its employees have operational experience that can be applied to SI. Based on EDS's inability to split SI out from its other businesses, INPUT has estimated its 1988 SI revenues as shown in Exhibit EDS-3.

EXHIBIT EDS-3

EDS SYSTEMS INTEGRATION REVENUES, 1988

Business Component	$ Millions
Federal	350
Commercial	155
Total	505

© 1988 by INPUT. Reproduction Prohibited.

As of February 1989, EDS reported it had 55,000 employees worldwide. As mentioned above, many of these employees have skills and knowledge that can be applied to SI. INPUT has not attempted to estimate the number of personnel assigned to SI, although they are distributed among the various functional disciplines as shown in Exhibit EDS-4.

EXHIBIT EDS-4

DISTRIBUTION OF SI PERSONNEL
EDS

Capability	Percent	
	Commercial	Federal
Management, strategy, planning	3	1
Legal/contract administration	1	1
Project management	10	5
System development/ implementation	75	78
Hardware/software evaluation/ acquisition	10	10
Hardware engineering	0	0
Sales	2	5

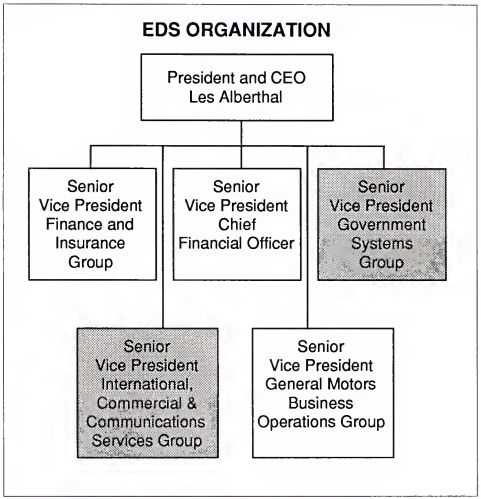
EDS is organized into four operationals group each headed by a senior vice president. Exhibit EDS-5 depicts this organization.

The General Motors Business Operations Group supplies information technology to much of GM's internal organization.

The Finance and Insurance Group has responsibility for serving these two vertical industries in the U.S. This group includes a national servicing capability for major health insurance companies. EDS has serviced these industries for most of its 27 year history.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT EDS-5


EDS ORGANIZATION
President and CEO
Les Alberthal
Senior Vice President Finance and Insurance Group
Senior Vice President Chief Financial Officer
Senior Vice President Government Systems Group
Senior Vice President International, Commercial & Communications Services Group
Senior Vice President General Motors Business Operations Group

The International, Commercial, and Communications Services Groups (ICCSG) and the Government Systems Group (GSG) are the focus of the majority of EDS's SI work. Senior Vice President, Gary Fernandes, heads ICCSG where most of EDS's commercial SI is accomplished and Stuart Reeves is the Senior Vice President heading GSG. These two organizations are highlighted in Exhibit EDS-5.

Exhibit EDS-6 shows the estimated 1988 revenue for each of the four business groups. As can be seen when compared with Exhibit EDS-3, the SI components of ICCSG and GSG are less than 50%, and in INPUT's opinion are secondary in importance to its systems operations components.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT EDS-6

EDS ESTIMATED REVENUE DISTRIBUTION, 1988

Organization	1988 Revenue ($ Millions)	Percent
International, Commercial and Communications Service Group	885	18
Finance and Insurance Group	970	20
Government Systems Group	735	15
General Motors Business Operations Group	2,255	47

When interviewed, the two EDS organizations that address most SI opportunities responded quite differently in regards to how they were organized to execute and manage SI contracts. This is illustrated in Exhibit EDS-7. The Government Systems Group operates in a decentralized mode, with the exception of hardware and software acquisition and systems operations, which are controlled centrally. ICCSG is much more centrally controlled, with all activities except strategy and long-range planning, project management and control, and implementation and development controlled from Dallas. These three responsibilities are shared by Dallas and decentralized locations. INPUT believes that the major reason for the differences in these responses are a result of the different customer requirements and ICCSG's proximity to EDS corporate headquarters.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT EDS-7

CENTRALIZATION/DECENTRALIZATION OF SI BUSINESS FUNCTIONS ELECTRONIC DATA SYSTEMS

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	D
Marketing and promotion	C	D
Account management/ sales	C	D
Contract review/approval	C	D
Project management/ control	B	D
Implementation/development	B	D
Hardware/software acquisition	C	C
Systems operations	C	C

C = Centralized, D = Decentralized, B = Both

7. SI Objectives and Revenues

EDS's business objectives are identified in Exhibit EDS-8. Management has set a goal of reducing its dependence on GM business to 50% by 1990. It is attempting to accomplish this by holding GM-derived revenues level, while continuing to increase traditional non-GM revenues by around 30%.

EDS continues to have a business objective of maintaining a client renewal rate in excess of 80%. It is offering systems integration in response to its customers' demands, and recognizes it as a vehicle to attract new systems operations candidates and to maintain control over its existing customer base.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT EDS-8

EDS BUSINESS OBJECTIVES

- 50% of business from non-GM sources by 1990
- 80% renewal rate
- SI as a source for systems operations contracts
- Control of existing customer base
- Profitable SI business

Finally the company is looking to the SI business to earn a profit.

8. Internal SI Capabilities Evaluation

- Business Consulting - EDS has good consulting experience in the area of developing large projects. It has very good technical consulting capability based on its extensive systems operations experience. Vertical-industry business consulting capability should be particularly strong in its base businesses, process and discrete manufacturing, retail and distribution, aerospace, and networking, all areas of SI concentration.

- Design Methodology, Design and Integration, Project Management, Software Development, Education, Training, and Documentation - Based on the experience it has gained both in its basic systems operations business and at GM, EDS has very capable skills in all of these areas.

- Packaged Application Software - EDS has developed and acquired a number of vertical market packages that it uses in its traditional business. Examples are The Insurance Machine™ for the insurance industry and Flagship™ for Credit Unions. It is not clear what role these products may play in SI only, non-facilities management projects. EDS indicated in its survey response that it would prefer to use all off-the-shelf products.

- Packaged Systems Software - The company prefers to use off-the-shelf products provided by other vendors.

© 1988 by INPUT. Reproduction Prohibited.

- Standard Computer Hardware - EDS uses standard off-the-shelf hardware provided by other computer manufacturers. EDS will most likely incorporate more Hitachi/NAS products in its bids, if those negotiations are completed.

- Custom Computer Hardware - EDS's commercial systems integration organization indicates that it has some custom hardware capability, but it would clearly prefer to use off-the-shelf.

- Network Management and Operations - EDS has extensive experience developing and managing G.M. networks and EDS's own network that supports its processing services capability.

- Service and Repair - EDS has a moderate capability to do hardware service and repair.

- Software Maintenance - The company has an adequate software maintenance capability.

9. SI Strategic Alliances

EDS has a formal alliance program that generally operates on a contract-by-contract basis. Alliances exist with computer hardware manufacturers, other GM organizations, customers, applications software providers, and non-U.S. partners. Examples of these alliances are shown in Exhibit EDS-9.

Hardware alliances have been established with leading vendors, including IBM, AT&T, Tandem, DEC, and Apple. The Tandem alliance includes a strong focus on the manufacturing industry. EDS's alliance with GM Hughes is focused at factory automation and telecommunications applications that require satellite-based products and services.

Customer partnerships such as the EDS, Banc One Corporation & Norwest Corporation alliance are used to develop application offerings in areas where EDS lacks applications skills.

Software alliances, while small in number, have provided solid gains for EDS in the telecommunications market.

EDS has established a number of international alliances. In February 1987 it established a 50-50 joint venture with Lucky-Goldstar Group, called System Technology Management (STM), to provide systems integration, data processing, and communications services to the Group's 20 affiliated firms and other Korean companies.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT EDS-9

EDS—STRATEGIC ALLIANCES

Hardware	Digital Equipment IBM AT&T Apple Tandem
Systems software	Ameritech
CIM/satellite products and services	GM Hughes Electronics
International SI	Lucky Goldstar Telfonics
Large retail bank processing systems	Norwest Corporation Banc One Corporation

In September 1987, EDS Communications Corp. and Telefonica (Spain's national telephone, postal, and telecommunications organization) established a joint-venture company to develop, market, sell, and install packet data networks worldwide using Telefonica's packet switching system.

10. SI Capabilities Summary

EDS has a very strong set of capabilities and few weaknesses in the SI arena (See Exhibit EDS-10). It has outstanding information systems operating knowledge in the services industries based on its experience running data processing installations for a great number of clients in the banking, financial, and insurance industries. It has similar experience with federal and state and local government customers.

Based on more recent experience with General Motors, EDS has developed operating experience in virtually all areas of a large manufacturing company, from CIM applications to the consolidation and installation of a worldwide communications network.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT EDS-10

EDS'S COMPETITIVE STATUS

Strengths	Weaknesses
Operational experience	Systems operations/ processing mentality
Vertical industry knowledge	Limited branch office
Large experienced skill base	Network
Understand new technologies	
Alliances	

These actual operating experiences make EDS uniquely qualified to develop and operate total information solutions. They also provide EDS with a very large and experienced skill base that can address a very broad range of industry applications.

EDS lacks hardware and software products, preferring to obtain other vendors' off-the-shelf products through its strong set of alliances. INPUT does not consider this a weakness because of EDS's strong financial resources and buying power leverage.

EDS has a solid understanding of new technologies and integration techniques based on its experience running 20 or more very large internal data centers.

INPUT does not believe that EDS has significant weaknesses. However, its traditional systems operation focus will most likely limit its competitiveness in some systems integration opportunities. Some prospects that are committed to running their own data processing operations will be reluctant to ignore EDS's traditional motivations when an SI solution is proposed. This is justified since it appears to INPUT that in most cases systems operations is the underlying motivation for EDS's SI activities.

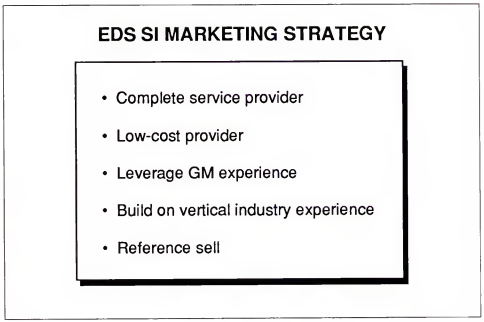
EDS does not have an extensive sales office network which may prove to be a disadvantage as it competes with hardware manufacturers that do.

© 1988 by INPUT. Reproduction Prohibited.

11. SI Marketing Strategy

Exhibit EDS-11 identifies the key elements in EDS's marketing strategy. The company promotes itself as a systems management firm. It wants to provide total service from developing an integrated solution, through systems integration, to total systems operations for the customer.

EXHIBIT EDS-11


EDS SI MARKETING STRATEGY
• Complete service provider
• Low-cost provider
• Leverage GM experience
• Build on vertical industry experience
• Reference sell

To achieve this goal, EDS's strategy is to be recognized as the low-cost provider of total systems management. INPUT believes EDS will leverage its GM-based buying power with hardware and software vendors and partners (e.g., NAS, if finalized), as well as the vertical-industry application knowledge it has developed at GM and while operating other installations in other industries.

Finally, a key element of EDS's strategy is to use references from successful systems integration and systems operations contracts to help sell to new clients. The company will use its own data center processing centers to demonstrate its capabilities and satisfied customers as references.

12. SI Customer Base

EDS has a broad range of systems operations customers. In many cases the first stage of these contracts requires it to develop a total integrated system solution. The majority of its revenue, however, comes from the follow-on systems operations activities. The following table, Exhibit EDS-12, identifies representative customers where INPUT believes

© 1988 by INPUT. Reproduction Prohibited.

systems integration is an element of the total systems operation offering. Contract values are not provided since INPUT believes that the systems operation content would make these values misleading.

EXHIBIT EDS-12

EXAMPLES OF EDS'S CUSTOMERS AND CONTRACTS

Company/Industry	Project Description
Champion Sparkplug	Computer integrated manufacturing
Caterpillar Tractor	Plant automation
Enron Corporation	Companywide systems management
State of Massachusetts	Welfare eligibility
U.S. Army - Project 80X	Personnel management
U.S. Navy - Spar	Global retail inventory and supply system

13. Summary and Future Directions

EDS's broad range of operational experiences make it a very capable competitor in the SI arena. These strengths include:

- Vertical-industry knowledge of its traditional client base as well as GM-based discrete and process manufacturing, distribution, and aerospace
- Operational project development and technology transition management skills based on actually running GM and EDS data centers and communications networks. This includes the capability to manage very large projects.
- A large satisfied customer base

© 1988 by INPUT. Reproduction Prohibited.

- Experience, financial resources, and product buying leverage provided by its parent, General Motors. This insures its ability to bid very large projects at very competitive prices.

- A focus on total systems management that allows the company to spread the initial systems integration risk over a longer time period and revenue stream

This last strength, a preoccupation on providing total systems management, may also turn out to be its one major weakness. As a weakness it can:

- Lower EDS's priority on bidding on SI only projects

- Preclude them from receiving serious consideration by the SI customer that wants an integrated solution only, not a systems management contract

INPUT believes that EDS will move even more toward the total systems management concept deriving its revenues not only from the front-end SI work, but also the follow-on systems operations contracts. The company will be extremely successful in systems management contracts, but less interested and less successful in standalone SI contracts.

© 1988 by INPUT. Reproduction Prohibited.

H

SHL Systemhouse (SHL)

1. Key SI Contacts

Peter A. Sandiford
President and Chief Operating Officer
SHL Systemhouse
1010 Glebe Road
Arlington, VA 22201
(703) 276-0500

Dennis B. Maloney
President
Systemhouse, Inc. (U.S. Operations)
1010 Glebe Road
Arlington, VA 22201
(703) 276-0500

2. Description of Principal Business

SHL Systemhouse, Inc. ("Systemhouse") was incorporated in Canada in July 1974. Systemhouse states that its only business is systems integration which it describes, in its 1988 annual report, "...as the business of delivering computer and communications systems to meet the specific and unique needs of large organizations. We visualize systems integration as a channel. Technology in the form of computer and communications hardware as well as systems and applications software products, flow through the Systemhouse channel where they are combined through design and a range of implementation services into a full working system for our customers. Ongoing systems management and operation frequently form part of the complete solution organizations are seeking."

Systemhouse does not focus on developing and delivering standalone software products or professional services, but rather, fully integrated and operational solutions. The lack of a focus on packaged software products is a result of previous financial losses experienced by its parent, Kinburn Technology Corporation, developing and marketing prepackaged application software.

Systemhouse's 1988 fiscal year revenues and profits (Sept. 1, 1987 thru August 31, 1988) were $240.7 million and $5.8 million Canadian dollars. This compares with 1987 results of $176.2 million and $23.7 million. These changes reflect good solid revenue growth, and July and August 1988 revenues for recently acquired ComputerLand Canada. The profit decline is primarily a result of significant losses in its Washington, D.C. office.

© 1988 by INPUT. Reproduction Prohibited.

Systemhouse's 1988 revenues were sourced 50% from Canada, 48% from the U.S., and 2% from Europe.

Systemhouse revenues for U.S. systems integration during its 1988 fiscal year ending August 31, 1988 were $91 million U.S. Exhibit SHL-1 provides a breakdown of these U.S. revenues.

EXHIBIT SHL-1

SHL SYSTEMS INTEGRATION REVENUES, 1988

Business Component	$ Millions
Federal	54
Commercial	37
Total	91

3. Systemhouse's Competitive Position

Systemhouse strengths include:

- An excellent reputation with its customers
- A well developed set of project management techniques and good implementation experience
- A reputation and experience in selected vertical industries, particularly federal government, state and local government, and wholesale and retail distribution
- Extensive expertise and experience with a wide-range of hardware and software provided from a broad-range of vendors
- Expertise in communications and imaging technology enhanced through acquisitions and alliances

Systemhouse has also demonstrated the ability to grow through cost-effective acquisitions and to manage these acquisitions efficiently.

© 1988 by INPUT. Reproduction Prohibited.

Examples of Systemhouse's few weaknesses are:

- It is not a well known company in the U.S. The systems integration business requires a proven record of success. While Systemhouse has an excellent track record, it is still not well recognized in the U.S., particularly by the commercial customer set.

- Its business base is dominated by the industries mentioned earlier which, although constituting a viable market niche, do not directly add to its marketing capability in commercial opportunities.

- Relatively modest revenues and profits preclude Systemhouse from bidding or being considered for the largest (and most profitable) projects. Its 1988 Washington D.C. loss demonstrates the impact a single location can have on overall company profitability. The company recognizes this and its recent acquisition and merger strategy will increase its revenue and profit base to help eliminate this weakness.

4. Markets Served

As mentioned earlier, Systemhouse operates in Canada, the U.S., and European markets. While it claims not to be vertical market oriented (again because of its parent organization's, Kinburn Technology Corporation, earlier software development experience), it is best known for its work on state and local government and wholesale and retail distribution projects. In the U.S. Systemhouse has also become a successful supplier to the federal government, where it is experiencing a growing number of repeat projects for the Army, Navy, Treasury, and the Social Security Administration. Systemhouse also has experienced significant success in the state of California, where three of its six U.S. branch offices are located.

5. Recent Events

Systemhouse has pursued a very aggressive acquisition program to expand its capability and accelerate its growth. Among its major acquisitions are:

- In April 1986 Systemhouse acquired Capital Systems of Alexandria Virginia for $7.5 million. Systemhouse gained 285 employees, $10 million in backlog, and access to the U.S. Departments of Treasury, Health and Human Services, Transportation, and Army and Navy.

- In February 1987, Systemhouse acquired the federal systems division of Yipcon Corporation of Fairfield, New Jersey for $4.4 million in cash.

© 1988 by INPUT. Reproduction Prohibited.

- In September 1987, Systemhouse established a wholly owned European subsidiary, SHL Systemhouse S.A. in Geneva, Switzerland. This subsidiary is responsible for systems integration activities outside of North America.

- During 1987, Systemhouse acquired two additional Canadian firms, DDC Consultants of Edmonton, Alberta and DPLA of Montreal, Quebec and a U.S. firm, ICT of Burlington, Massachusetts that has expertise in optical disks and image processing.

- During 1988, Systemhouse purchased GSA of Quebec to expand its capability in that province and Rand Information Systems, a northern California firm to expand its presence in California and provide data conversion capability to all Systemhouse branches.

- The most significant investment by Systemhouse in 1988 was the acquisition of ComputerLand Canada in July. ComputerLand provides Systemhouse with 70 business solution centers in 55 locations throughout Canada. These centers are described by Systemhouse as much more than retail stores, and expand its microcomputer-based systems integration capacity significantly.

During the second quarter of 1988, Systemhouse entered into a five-year teaming agreement with Chicago-based Ameritech to work co-operatively on the development of systems integration opportunities in the five-state region where Ameritech provides telephone service. It is anticipated that this agreement will result in over $100 million of revenue. This agreement also includes the licensing of Systemhouse's proprietary Systems Integration Life Cycle Methodology (SILC) to Ameritech for $12 million.

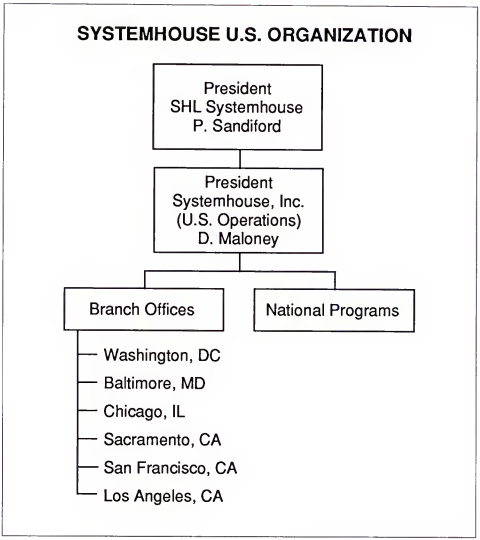
6. SI Organization

Systemhouse has a simple U.S. organization that is project management focused. The organization consists of six branch offices and National Systems, that report to the President of Systemhouse, Inc, Dennis Maloney. Mr. Maloney, located in Washington D.C., reports to the president of Systemhouse, Peter Sandiford. Each of the branch offices has geographic responsibility for SI projects and operates as a profit center. National Systems, also a profit center, is headquartered in Washington D.C. and has responsibility for bidding and implementing programs outside of the six geographic branches' territories. The U.S. organization is depicted in Exhibit SHL-2.

Branch offices are located where the majority of Systemhouse's clients are located, in California, the Washington-Baltimore corridor, and the Chicago region. Systemhouse will establish new branch offices and profit centers as the quantity of work grows in other geographic areas.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT SHL-2



Based on INPUT's interviews with Systemhouse, responsibilities are distributed as shown in Exhibit SHL-3.

This figure demonstrates Systemhouse's decentralized organizational focus, with branches involved in all business functions and with centralized support in the areas of strategy and long-range planning, marketing and promotion, contract review and approval, and hardware and software acquisition.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT SHL-3

CENTRALIZATION/DECENTRALIZATION OF BUSINESS FUNCTIONS SYSTEMHOUSE

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	B
Marketing and promotion	B	B
Account management/ sales	D	D
Contract review/approval	B	B
Project management/ control	D	D
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operations	N/A	N/A

C = Centralized, D = Decentralized, B = Both

Systemhouse has approximately 2,500 employees doing systems integration work worldwide. Systemhouse indicates that approximately 2,100 employees are assigned to commercial systems integration and 400 to federal. This represents nearly the entire workforce since Systemhouse considers all of its business offerings to be systems integration. Exhibit SHL-4 provides an indication of how these resources are distributed.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT SHL-4

DISTRIBUTION OF SI PERSONNEL
SYSTEMHOUSE

Capability	Percent
Management, strategy, planning, marketing	5
Legal/contract administration, finance	5
Project management and administration	10
Design/development/implementation	40
Hardware/software evaluation/acquisition	20
Hardware engineering	10
Sales	10

7. SI Business Objectives

Systemhouse wants to continue to grow at over 30% and achieve net profits that exceed 10%. It is attempting to achieve these goals by focusing on systems integration as its only business. By investing in relationships with technology suppliers and in technology evaluation and training, the company has positioned itself to meet its key business objectives. These objectives are to provide its customers with the best possible technical solutions and to grow its revenues and profits.

Account control and follow-on hardware sales and facilities management contracts are secondary business objectives.

8. Internal SI Capabilities Evaluation

Fundamental to Systemhouse's business strategy is its proprietary systems integration Life Cycle Methodology (SILC) which the company continues to refine and enhance. Systemhouse is currently on Version 6 of this methodology which it believes leads the industry by at least two to three years.

© 1988 by INPUT. Reproduction Prohibited.

Each employee receives and must sign for a set of ten or so small booklets which describe each of the elements of the SILC methodology. The books address how to approach each of the elements of defining and implementing a system solution. SILC goes well beyond traditional system development methodologies encompassing not only the software development cycle, but also, project management, strategic planning, facilities engineering, quality assurance, architecture definition, capacity planning, and other disciplines essential to successful systems delivery.

The methodology is well conceived, practical, and uses the most advanced tools, including CASE and modeling techniques.

While there is a certain amount of mystique regarding SILC, INPUT believes that it is the result of a significant investment in methodology that has and will provide Systemhouse with a competitive advantage. It provides a set of tools that lead the industry, results in efficient implementation, on time and within budget, and significantly reduces the risk of major failure.

a. Business Consulting

While the SILC methodology includes business consulting, INPUT believes its focus is capturing current requirements and processes so that technology can be applied to automate them. It is not business consulting from the perspective that results in fundamental business process change. Systemhouse does not have strong vertical industry knowledge and depends on the customer for industry business process knowledge. While this is not a show stopper, it may preclude Systemhouse from bidding on some SI opportunities where the customer requirements include business consulting and business process change.

b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation

These SI elements are all included in the SILC methodology described above and Systemhouse receives very high marks for these capabilities. Systemhouse has told INPUT that it prides itself in its ability to develop and maintain highly qualified project managers. The company indicates that its personnel policies are designed to retain project managers, many of whom have over 15 years of experience.

c. Packaged Application Software

Systemhouse chooses not to develop packaged application software, but rather prefers to have the option to select the best available packages in the market to meet the needs of the current SI engagement. This approach is further supported by Kinburn Technologies' earlier failures in the application software business.

© 1988 by INPUT. Reproduction Prohibited.

d. Packaged Systems Software

Like applications software Systemhouse prefers to select the best available hardware and software for the current SI engagement and not to be biased by a limited set of software and hardware vendor relationships. It has relationships with most leading fourth-generation software vendors.

e. Standard Computer Hardware

Systemhouse has no hardware products of its own. It has relationships and experience with most leading hardware vendors' equipment including, but not limited to, DEC, IBM, HP, Wang, and Tandem. Its recent acquisition of ComputerLand Canada will expand these relationships significantly in the microcomputer area.

f. Custom Computer Hardware

Systemhouse does not develop custom computer hardware.

g. Network Management and Operations

While Systemhouse has strong ties with Ameritech it does not participate independently in the network management and operations market.

h. Service and Repair

Systemhouse depends on hardware manufacturers for hardware service and repair.

i. Software Maintenance

Since Systemhouse does not develop system or application software packages, its software maintenance capability is limited to custom software repair and enhancement.

9. SI Strategic Alliances

Systemhouse has a strong set of relationships with a variety of hardware and software vendors that are described in Section 8. These include, but are not limited to, hardware vendors; Digital Equipment, IBM, Hewlett-Packard, Amdahl, and Wang and software vendors; Oracle and Relational Technologies in data base management systems and Cognos and Applied Data Research in fourth-generation languages. Northern Telecom, another Canadian vendor, is a sound and logical choice for a communications partner. Exhibit SHL-5 summarizes these alliances.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT SHL-5

SHL SYSTEMHOUSE STRATEGIC ALLIANCES

Hardware	Digital Equipment IBM Hewlett-Packard AMDAHL Wang
Systems Software	ORACLE Relational Technology COGNOS Applied Data Research
Telecommunications	Northern Telecom Ameritech

As mentioned earlier in this report, Systemhouse has also established a five-year alliance with Ameritech to provide systems integration services to the five-state region where Ameritech provides communications services. INPUT believes they will become a very strong team in that region.

10. SI Capabilities Summary

Overall, Systemhouse has a strong set of system development and implementation skills, built around its proprietary SILC methodology. It intentionally lacks packaged application and systems software, standard and custom computer hardware, and communications hardware capabilities. It has established a broad set of alliances with hardware and software vendors to provide those elements it lacks. It uses these relationships to select the best set of components to satisfy the needs of each systems integration opportunity.

11. SI Marketing Strategy

Systemhouse's marketing is built around excellence in a single business, systems integration. To support this strategy it has developed a broad set of technical skills and a proprietary methodology known as Systems Integration Life Cycle methodology (SILC). The company offers its services to any market that demonstrates a genuine need for systems

© 1988 by INPUT. Reproduction Prohibited.

integration services. It will respond to RFPs and leverage its previous success in existing accounts. It will add new branch offices to service new geographies when sufficient business is generated in that area by the national programs branch office.

- Competitors - Systemhouse considers Andersen Consulting and EDS to be its two major competitors in the U.S. commercial market. It also recognizes other "Big Eight" Accounting firms and hardware manufacturers as additional commercial SI competition. It has identified EDS, CSC, Andersen Consulting, and IBM as its major competitors in the federal arena.

- Positioning - Systemhouse indicates that its strategic focus is on federal government, state and local governments, wholesale and retail distribution markets, and telecommunications and imaging opportunities. The firm does not focus on specific vertical markets, but rather opportunities where it can leverage its methodology and technology expertise to satisfy an integration requirement.

  Its strategy also includes leveraging applications installation experience. An example of this successful approach is the company's ten successive awards for welfare eligibility systems in state governments.

- Promotion - Systemhouse does limited, if any, formal promotion in the U.S. market. They rely solely on referrals of satisfied customers and claim that this "word-of-mouth" promotion has been highly successful.

12. SI Customer Base

Systemhouse indicated that in 1987 and 1988 it worked on or completed 30 commercial SI contracts with an average contract value of $3 million and 70 federal contracts with average values of $20 million. Examples of some of its successful programs are depicted in Exhibit SHL-6.

Systemhouse performed on additional programs that include welfare eligibility systems for Arizona, Idaho, Utah, Alaska, Kansas, Wyoming, South Carolina, Montana, Kansas, and Washington. Commercial systems integration projects include a retail product tracking system for Actmedia, Inc., an ISDN networking system for McDonald's Corporate headquarters, a billing verification system for U.S. Sprint, and a central customer interface system for GTE. Federal programs included a DEC VAX-based planning, programming and budgeting system for the U.S. Navy, an on-line image-based tool cataloging system prototype for the Defense Logistics Agency, and an on-line Social Security Entitlement Program for the Social Security Administration.

© 1988 by INPUT. Reproduction Prohibited.

EXHIBIT SHL-6

EXAMPLES OF SYSTEMHOUSE'S SI PROGRAMS

Company/Industry	Project Description	$ Millions
State of California	Student financial aid	5.2
Hawaii Dept. of Social Welfare Eligibility	Welfare eligibility	4.1
Columbus/Franklin County Library	Support system	2.8
Chrysler Corporation	Quality assurance system	N/A

13. Summary and Future Direction

Systemhouse's strength is built around its methodology, SILC, and its ability to manage the application of technology to identified business problems. It seems to have the ability to understand and manage many technologies sourced from many vendors.

Systemhouse promotes itself as a vendor that is not wed to a particular vendors hardware or software. This allows it to develop and propose a solution that is objective and not biased by the limited product offerings of any single or limited set of vendors.

Systemhouse has an excellent reputation among its customer base. This reputation has proven effective as a reference to acquire new clients and to establish alliances with a large number of important hardware and software vendors.

The alliance with Ameritech provides Systemhouse with a source of new clients and additional revenue and profit growth. It also provide it with a partner to strengthen a weakness in the networking area.

Systemhouse needs to continue to expand its presence in the U.S. market. Its current six or seven branch office network somewhat limits its ability to do this. INPUT believes that it will continue to pursue its acquisition and alliance strategy to address this weakness.

© 1988 by INPUT. Reproduction Prohibited.

Systemhouse's affinity to developing vertical-industry knowledge and applications software packages may preclude it from succeeding in an important segment of the systems integration market. This is the segment where the customer is looking for business consulting as a means to change some of the fundamental business processes within the enterprise. INPUT believes that this set of customers will ultimately look to the same business consultants, if they are integrators, to implement the recommended change through an SI contract.

Finally, INPUT believes that Systemhouse, based on its commitment to excellence and continued investment in SI methodology, will continue to enjoy success and be an important player in the U.S. systems integration market.

© 1988 by INPUT. Reproduction Prohibited.

I

Computer Sciences Corporation

1. Key SI Contacts:

Federal Systems Integration

A. E. Nashman
Group President, Systems Group
3160 Fairview Park Road
Falls Church, Virginia 22042

Commercial Systems Integration

Mr. Thomas P. Gerrity
Group President, Consulting Group
5 Cambridge Center
Cambridge, Mass. 02142

Mr. Mel Bergstein
Senior Vice President, Consulting Group
5 Cambridge Center
Cambridge, Mass. 02142

Mr. James A. Champy
Chairman, Index Group, Inc.
Cambridge, Mass.

Mr. Paul J. Crowley
Chairman, CSC Partners, Inc
Waltham, Mass.

Corporate (Federal or Commercial)

Dr. Walter Culver
Vice President, Systems Integration
3160 Fairview Park Road
Falls Church, Virginia 22042

2. Description of Principal Business

Computer Sciences Corporation is a nearly pure computer services organization. It manufactures minimal amounts of equipment, primarily specialized communications interfaces in low volume. It promotes itself as a leading systems integrator and software developer. The company also provides specialized proprietary services to markets such as finance, healthcare, claims processing, network management and income tax processing. It provides value-added communications services and remote computing services to private industry and government.

© 1989 by INPUT. Reproduction Prohibited.

Exhibit CSC-1 includes CSC's revenues for fiscal year 1989, which ended March 31, 1989. As can be seen, the majority of revenues (67%) was derived from federal systems and services.

EXHIBIT CSC-1

Fiscal Year 1989* Revenues by Business Segment

Business Segment	Revenues ($M)	Percent
Federal systems & services	881.1	67
Professional services	143.8	11
Credit services	110.9	9
Health & insurance systems	79.4	6
Infonet	63.7	5
Complementary services	25.5	2
Total	1304.4	

* Fiscal Year Mar. 31, 1988 - Mar. 31, 1989

In addition to sustained growth in this traditional business area, CSC is making a major thrust to expand its business into the commercial market through its professional services business, which represented 11% of its fiscal year 1989 business. These services include consulting and systems development and integration services for commercial, financial, industrial and international clients.

The remaining 22% of CSC's business is derived from consumer credit services (9%), health and insurance processing services (6%), Infonet, a worldwide data communications network (5%) and a service segment which provides income tax processing services and turnkey computer-integrated manufacturing systems (2%).

3. CSC Competitive Position

CSC has been very successful with its federal systems and services and professional services businesses, where it has provided requirements analysis, software development, systems engineering and integration, and

© 1989 by INPUT. Reproduction Prohibited.

communications and facilities management, primarily to its major customer, the U.S. federal government. The company has historically had a very high success rate, winning over 60% of bids. It also has a strong base of multi-year mega-contracts, generally contracts with a total value in excess of $100 million, which fuel the company's traditionally strong growth rates. CSC reports that in fiscal 1989 it won eight such awards with total contract values in excess of $1.7 billion, in addition to scores of smaller contracts.

CSC had not played a major role in the commercial professional services market before 1987, when it announced a goal of attaining 50% of its profits from commercial business by 1992, based on increasing its commercial revenues to 40% of the total. The company also announced at that time that it had $200 million to spend on acquisitions to augment its existing commercial business. It has made several significant acquisitions to implement this strategy including Computer Partners, Index Group and CIG-Intersys, which will be described in Section 5, Recent Events.

In January 1989, it sold a majority interest in Infonet, its worldwide public network subsidiary, to a group of European and Pacific telecommunications administrations to strengthen Infonet's position as an international communications service. CSC had an extremely successful fiscal 1989, with revenues growing 13% and net earnings 21%. Its federal revenues grew significantly (20%), despite a fiscally constrained federal market. This success, combined with the removal of Infonet from CSC consolidated financial statements as of January 1989, has in fact increased the federal business from 67% to 71%, as shown in Exhibit CSC-2.

EXHIBIT CSC-2

CSC Fiscal Year Revenues by Major Market

Market Segment	Percent of Total Revenues		
	1989	1988	1987
Federal government	71	67	67
Commercial	20	20	18
State and local government	3	5	8
International	6	8	7

© 1989 by INPUT. Reproduction Prohibited.

INPUT believes that a cornerstone of CSC's commercial thrust will be systems integration. It will combine its federal systems integration experience with the consulting and vertical marketing expertise gained through its existing commercial processing services businesses and acquisitions. It can also be expected that CSC will continue to look for acquisition candidates to broaden its commercial capability and geographic coverage.

CSC indicated that its calendar year 1988 systems integration revenues were $345 million, distributed as shown in Exhibit CSC-3.

EXHIBIT CSC-3

CSC Systems Integration Revenues 1988

Business Component	$ Millions
Federal	300
Commercial	45

4. Markets Served

CSC has expertise in tax, credit, health and insurance processing through its processing services offerings. CSC Partners (formerly Computer Partners) provides vertical market expertise primarily in manufacturing, distribution, finance, insurance, retail, publishing, utilities and state and local government. CIG-Intersys provides European experience in retail banking as well as in the other vertical industry markets in which CSC claims strength. The company is leveraging this experience by focusing its systems integration activities on the vertical industries identified in Exhibit CSC-4 .

Exhibit CSC-4 also identifies specific functional markets that CSC is pursuing. Its focus on these markets is a result of its technology expertise, gained from participating in many large federal programs.

© 1989 by INPUT. Reproduction Prohibited.

EXHIBIT CSC-4

SI Market Focus—CSC

Vertical Industry	Functional
Federal government	Networking
State and local government	Office automation
Distribution	Digital image handling
Retail	
Finance	Facilities management
Insurance	Logistics
Telecommunications providers	
Publishing	
Manufacturing	

5. Recent Events

In July 1986, CSC acquired Computer Partners (revenues of approximately $15 million), a professional services firm with offices in the northeast corridor. Computer Partners, now known as CSC Partners, has vertical market expertise in manufacturing, distribution, finance, insurance, utilities, and state and local government.

In October 1988, CSC acquired Index Group, Inc. ($30 million in annual revenues), a leading consulting firm to major U.S. and European companies specializing in the strategic use and management of information technology. This acquisition added a strong senior commercial consulting capability to CSC's strong systems integration credentials.

In April 1989, CSC announced that it would acquire CIG-Intersys, the largest computer services organization in Belgium (1988 revenues of approximately $85 million). CIG also operates in France and the Netherlands, and holds minority ownerships of firms in Argentina and West Germany. It provides consulting, computer systems and network integration, software engineering, software products, and data processing services. CSC already had European operations in the United Kingdom,

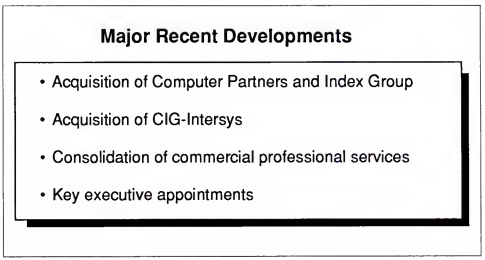
© 1989 by INPUT. Reproduction Prohibited.

Germany, the Netherlands and Belgium. This acquisition strengthens its European market position as well as adding specific European vertical market knowledge.

In May 1989, CSC created a separate commercial and international group, called the Consulting Group, which brings together under one organization: CSC Partners, focused on commercial systems development and integration; Index Group, which works with clients on information technology strategies; European operations, including CIG-Intersys; and Communications Industry Services, a software development organization for telephone company needs. This Group is managed by Thomas Gerrity, former Chairman of the Index Group, and is focused on providing commercial and international customers with a full range of information services. This move focuses these organizations, which originally reported independently to the Chairman, under a single management focused on the commercial and international professional services market.

In mid-July 1989, CSC announced that Mel Bergstein, a former senior partner of Andersen Consulting and a well known and respected industry figure, had joined CSC as a senior executive in the Consulting Group. While with Andersen Consulting, Mr. Bergstein was instrumental in the technical development of development methodologies and products, including FOUNDATION and MACPAC. He was also responsible for the development of a strong sales organization. His reputation and knowledge will assist CSC in future acquisitions, product development, refocusing federal skills and methodologies to commercial markets, and in the overall marketing and sale of CSC's evolving capabilities. This event emphasizes again how serious CSC is about penetrating commercial systems integration.

EXHIBIT CSC-5

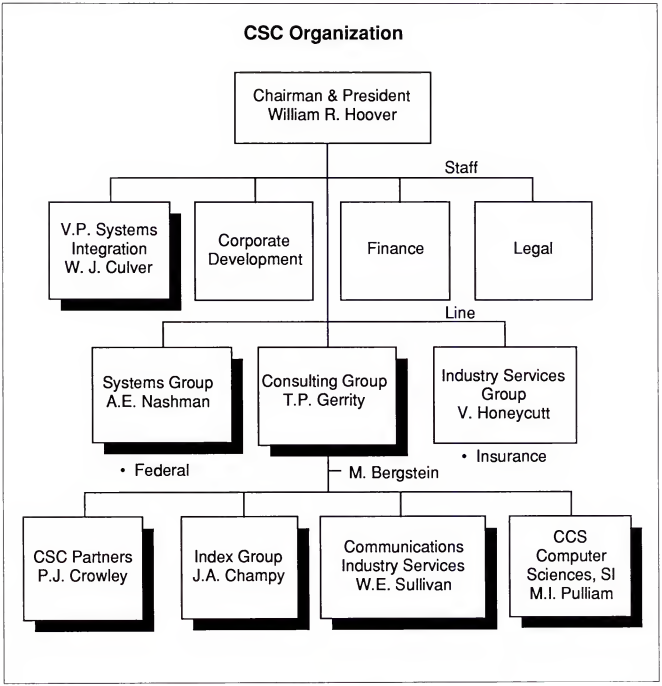

Major Recent Developments
• Acquisition of Computer Partners and Index Group
• Acquisition of CIG-Intersys
• Consolidation of commercial professional services
• Key executive appointments

© 1989 by INPUT. Reproduction Prohibited.

6. CSC Organization

The CSC organizations that are involved in systems integration are highlighted in Exhibit CSC-6.

EXHIBIT CSC-6



© 1989 by INPUT. Reproduction Prohibited.

SI resources are distributed across two groups consisting of a number of divisions and companies. Federal systems integration activities are the responsibility of Alvin Nashman, Group President, Systems Group. Commercial systems integration activities are the responsibility of Tom Gerrity, Group President of the Consulting Group, and are carried out in CSC Partners, Index Group, Communications Industry Services and CSC Computer Sciences, S.A. (European activities). Walter Culver, Corporate Vice President of Systems Integration and former operating executive of the Systems Group, provides staff focus and guidance for systems integration, pursues corporate-to-corporate alliances, and insures that resources are shared effectively across both market segments.

CSC has an SI staff of approximately 3000, 2000 of whom are focused on federal work and 1000 on commercial.

Exhibit CSC-7 is an estimate of how the SI personnel are distributed among functional activities. There is a strong professional services content with 85% of the resources allocated to project management, systems development and implementation, hardware and software evaluation, and acquisition and hardware engineering.

EXHIBIT CSC-7

CSC Distribution of SI Personnel

Capability	Percent
Management, strategy & planning	5
Legal support/contract administration	5
Project management	15
System development/implementation	50
Hardware/software evaluation/acquisition	15
Hardware engineering	5
Sales	5

CSC has a similar organization philosophy for both federal and commercial SI activities. As indicated in Exhibit CSC-8, most implementation activities are decentralized, though marketing and promotion are done centrally. Strategy and long-range planning are a joint activity with both

© 1989 by INPUT. Reproduction Prohibited.

line and headquarters participation. Account management and sales are performed centrally for federal SI and are both centralized and decentralized for commercial SI.

EXHIBIT CSC-8

Centralization/Decentralization of SI Business Functions

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	B
Marketing and promotion	C	C
Contract review/approval	B	C
Account management/sales	D	D
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	D	D
Systems operations	D	D

(C=Centralized, D=Decentralized, B=Both)

7. SI Business Objectives

CSC is clearly focused on systems integration as a means of changing its revenue and profit mix. As mentioned earlier, CSC's primary objectives for SI are revenue and profit growth, particularly in commercial SI. Commercial SI expansion will be driven by corporate business objectives that include 40% of revenues and 50% of profits being derived from the commercial business. CSC recognizes that industry is looking for business and information consulting and business solutions, and has established a primary objective of responding to these customer demands.

© 1989 by INPUT. Reproduction Prohibited.

Secondary SI objectives are control and expansion of its account base, and developing a follow-on facilities management business. The company's objectives do not include significant, if any, hardware or software sales.

8. Internal SI Capabilities Evaluation

CSC's experience, its strong set of technical skills, and its success in federal systems integration positions it well to participate in the commercial SI market. In addition, through acquisition and its processing services activities, it has a base of commercial skills. Brief comments on the individual SI capabilities are described below:

a. Business Consulting—These skills, once limited to federal applications, have been expanded to the commercial market through the acquisition of a premier consulting organization, Index Group. The acquisitions of Computer Partners and CIG-Intersys also strengthen this area.

b. Design Methodology—CSC has been known traditionally as a competent and capable designer of information solutions. It has and uses CASE products to support its design methodology.

c. Design and Integration, Project Management, Software Development, and Education, Training and Documentation—CSC has been strong in these areas and should be able to transfer these capabilities to commercial opportunities effectively.

d. Packaged Application Software—CSC's primary application software offerings are provided through its Industry Services Group. It had marketed a turnkey system called MAN-FACT II to discrete manufacturers, but sold it in March 1989. CSC also has developed industry-specific software for insurance and tax processing.

e. Packaged Systems Software, Standard Computer Hardware and Custom Computer Hardware—Computer Sciences manufactures no computer hardware, nor does it develop systems software products. It prefers the flexibility of being able to select the products that are best suited to meet the needs of the current systems problem and that will provide the best solution.

k. Network Management and Operations—CSC has strong network management and operations capability as a result of experience developed through its remote processing businesses, its worldwide Infonet network, and the building of private data networks for the U.S. government. It has participated successfully in large federal network contracts such as the U.S. Treasury and FTS-2000. It is interesting to note that it often works closely with AT&T; announce-

© 1989 by INPUT. Reproduction Prohibited.

ment of a formal relationship with them has been rumored in the past.

m. Service and Repair—CSC offers sytem service and repair only as part of its remote processing and network services, or ancillary to its systems integration contracts.

n. Software Maintenance—Since CSC provides limited software products, it has limited software package maintenance capability.

9. SI Strategic Alliances

CSC has not made a conscious effort to publicize a broad set of alliances. It believes that development of these alliances would cast doubt on its ability to be truly independent in developing the best solutions for its customers. In its federal SI efforts, CSC has worked with most of the major hardware and software vendors in teaming or prime contractor/subcontractor relationships. The company feels comfortable that it can develop and work whatever relationships are necessary to meet its prime contractor responsibilities.

Among its many relationships, of particular note are those with AT&T and IBM. AT&T is a major CSC customer and CSC has developed a number of projects for and with them, including the major U.S. government communications contract, FTS-2000. CSC has worked with IBM on a variety of programs, the largest being the recent $3.5 billion FAA award.

Overseas, CSC announced last year a five-year joint marketing agreement with British Telecom.

10. SI Capabilities Summary

Exhibit CSC-9 identifies CSC's major strengths and weaknesses. As a candidate in the commercial SI arena, it has strong experience and technical capabilities. It has a reputation in the federal market as an aggressive competitor and competent integrator. It has broad and strong technical and management skills. It is not committed to a single vendor's hardware and/or software products and, as a result of its recent acquisitions, now has commercial strategic consulting skills and enhanced vertical industry knowledge and experience.

© 1989 by INPUT. Reproduction Prohibited.

EXHIBIT CSC-9

CSC Competitive Status

Strengths	Weaknesses
Federal SI experience	Geographic coverage
Technical strength	Commercial sales organization & experience
Product vendor independence	
Business consulting skills	

CSC's major weaknesses in the commercial market are its lack of commercial marketing experience and geographic sales and implementation coverage.

11. SI Marketing Strategy

CSC's systems integration strategy is now focused in the Consulting Group, as indicated in exhibit CSC-10.

EXHIBIT CSC-10

CSC SI Marketing Strategy

- Focus commercial growth in Consulting Group
- Focus on strategic consulting, then implementation
- Leverage federal experience
- Build on Partners' and CIG-Intersys' commercial experience

© 1989 by INPUT. Reproduction Prohibited.

The marketing strategy appears to be built on leveraging the Index Group's strategic consulting reputation and programs. The Index Group has provided high-level education and consulting to both U.S. and European clients. It has a reputation for providing excellent client support in identifying strategic information systems requirements, developing strategic solutions that provide competitive advantage, and addressing mission-critical applications. This capability that Index Group provides is critical to CSC's marketing strategy, as it does not otherwise have access to a large commercial customer base or a large commercial sales force.

From an implementation point of view, CSC's credentials are extremely strong, as it has its federal skill base, CSC Partners and CIG-Intersys to call on in this area. As other federal integrators have recognized, CSC will have to train its people to interact effectively with commercial customers, and to modify its federal implementation practices in order to work effectively in a commercial environment. Partners and CIG-Intersys appear to be excellent vehicles to assist in this transition.

12. SI Customer Base

A number of the projects that CSC has won and is implementing are listed in Exhibit CSC-11. They are:

- Dade County Airport—As prime contractor, CSC has been responsible for the automated cargo information system for the airport and seaport of Miami, Florida. Responsibilities include design, implementation, integration, and facility management of the system, including software, communications equipment, and user procedures. The system connects 20 airlines, 15 brokers/forwarders, and the required federal agencies.

- U.S. Air Force—As prime contractor, CSC is providing systems integration services for the Air Force's new Stock Control and Distribution system. CSC's deliverables include the teleprocessing to support transportation and depot processing, retail and maintenance operations, inventory control points, and depot management.

- Cincinnati Gas and Electric—CSC is participating in all phases of the development of a new on-line customer service system that includes subsystems for order entry and tracking, billing, and financial records processing.

- AT&T—CSC maintains, enhances, and develops the circuit provisioning system used nationwide by AT&T to issue and track service orders, maintain an inventory of equipment and facilities, and design long-distance circuits.

- U.S. Treasury Department—CSC is the prime contractor for the design, integration, implementation, and operation and maintenance of the

© 1989 by INPUT. Reproduction Prohibited.

Consolidated Data Network which meets the needs of the various departments of the Treasury. At this date, the major user is the U.S. Customs Service, with the IRS just beginning to phase in. The packet-switched network has 21 backbone nodes, and by the mid-1990s will serve 7,500 locations worldwide and over 65,000 terminals.

- Kennedy Space Center—CSC is the prime contractor responsible for NASA/KSC's office automation system. This system supports all secretarial, professional, and management staffing at KSC.

- Major Steel Firm—This five-year project, called IMIS (Integrated Manufacturing Information System), is focused on providing superior customer service through improved inventory control and scheduling and other state-of-the-art manufacturing techniques.

- Massachusetts Water Resources Authority—This project involves the implementation of a major information system to monitor and control the progress of the large capital projects that the Authority will be im-

EXHIBIT CSC-11

Examples of CSC's Customers & Contracts

Company/Industry	Project Description
Dade County Airport	Automated Cargo Information System
U.S. Air Force	Stock Control and Distribution
Cincinnati Gas and Electric	Customer Services System
AT&T	Trunk Inventory and Control System
U.S. Treasury Department	Consolidated Data Network
Kennedy Space Center	Office Automation System
Major Steel Firm	Manufacturing Information System
Massachusetts Water Resources Authority	Capital Projects Information System

© 1989 by INPUT. Reproduction Prohibited.

plementing over the next several years to improve water and sewer systems in 60 communities.

13. Summary and Future Directions

It is clear that CSC has set its sights on becoming a major player in commercial systems integration, and is making significant investments to reach this goal. It has carefully selected and acquired firms that will help it achieve this goal. INPUT believes CSC's strategy, which is built around strategic consulting provided by the Index Group and its solid federal project management skills, is sound. It provides unique commercial consulting experience as well as access to a commercial client base—both capabilities that federal integrators generally lack.

Its acquisition of CSC Partners and CIG-Intersys provide it with the bridge that is necessary to convert federal experience and skills to commercial application implementation. However, CSC may not yet realize quite how difficult this step is. The recent appointment of Mel Bergstein shows how serious CSC is about commercial SI, and he may be the necessary ingredient in making the transition from federal to commercial markets, and in broadening CSC's commercial marketing capabilities.

INPUT believes that CSC will continue to acquire commercial firms that expand its geographic and vertical industry coverage. On the whole, CSC's strategy seems sound.

© 1989 by INPUT. Reproduction Prohibited.

J

American Management Systems

1. Key SI Contacts

Charles O. Rossotti
Chairman
1777 North Kent Street
Arlington, VA 22209
(703) 841-6000

Commercial

Patrick Gross
Vice Chairman
1777 North Kent Street
Arlington, VA 22209
(703) 841-6000

Federal

Paul Brands
Executive Vice President
1777 North Kent Street
Arlington, VA 22209
(703) 841-6000

2. Description of Principal Business

American Management Systems (AMS) is a $200 million systems integrator which offers a full set of products and services to its targeted market. See Exhibit AMS-1.

EXHIBIT AMS-1

AMS Offerings by Market

Offerings	Financial Services	Federal/ Aerospace	State/Local Universities	Telecommu-nication	Energy	Other Industries
Software Products	X	X	X	X	X	
Professional Services	X	X	X	X	X	X
Processing Services/ System Operations	X	X	X			X

© 1990 by INPUT. Reproduction Prohibited.

AMS has been a pioneer in several ways:

- AMS successfully offers a combination of packaged software and services aimed at specific markets; many other companies have tried and failed in offering such a combination.

- AMS has used this approach successfully for over ten years in both the government and nongovernment markets. Many of AMS' federal market competitors have not been successful in the commercial market.

AMS has over 2,700 employees and has offices in more than 20 cities in the U.S. and Canada.

3. Competitive Position

AMS' principal achievement has been its ability to build businesses with good growth rates across five market areas, as shown in Exhibit AMS-2. This positioning across widely different sectors will prove especially important over the next few years as expected cuts in defense spending take place. AMS should be able to redeploy its assets more readily than many of its military systems integration (SI) competitors.

EXHIBIT AMS-2

AMS Markets: Size and Growth

Market	1988 Revenues		Revenue Growth 1987-1988 (Percent)
	$ Million	Percent	
Federal/Aerospace	62.0	35.4	20
Financial Services	37.2	21.3	17
State/Local Governments and Universities	32.1	18.3	17
Telecommunications	11.2	6.4	64
Energy Industry	9.1	5.2	55
Other Industries	23.4	13.4	9
Total Revenues	175.0	100.0	21
Reimbursed Expenses	38.3		
Grand Total	213.3		

© 1990 by INPUT. Reproduction Prohibited.

AMS' estimated systems integration revenues are shown in Exhibit AMS-3.

EXHIBIT AMS-3

AMS 1989 Systems Integration Revenues

Business Component	$ Millions
Federal	15
Commercial	125

A related strength is AMS' special relationship with IBM. This will be described and analyzed in Section 5, below.

AMS has "proceduralized" much of its knowledge of specific markets into software packages. This often enables AMS to offer a combination of packaged and customized services to clients. This approach, when it works as intended, can offer the customer a high-quality system that meets specific customer requirements, at a lower cost and a faster implementation time than competitors that offer only packaged software or only customized solutions.

AMS is bound to have some problems with its federal defense business over the next few years, as programs are stretched out and cut back. Even though AMS' federal business only accounts for about one-third and its defense business for about 15% of AMS' overall revenues, the uncertainties associated with these businesses could still create management and financial problems for AMS.

A larger issue is whether AMS has the project and financial skills to achieve a significant level of profitability in its SI business. In principle, AMS should be quite profitable:

- Two-thirds of its business is already in the commercial market; most of that is in specialized vertical markets.
- One-third of its business is in software products, which usually have higher margins.
- Its professional services are largely aimed at more specialized and value-added areas, rather than at the lower margin "commodity" business.

© 1990 by INPUT. Reproduction Prohibited.

However, AMS' operating margins (6-8% range) and net margins (3-4% range) look much more like that of a relatively undifferentiated professional services firm (or provider of federal government services). See Exhibit AMS-4. This raises questions as to whether changes in its management approach may not be necessary in order to bring AMS' financial returns in line with its successful growth and record of technical achievement.

EXHIBIT AMS-4

AMS Margins

Margins	1988	1987	1986	1985
Operating (Percent)	5.2	7.7	7.6	5.8
Net	3.5	4.3	3.9	2.9

4. Markets Served

AMS targets five principal markets:

- Federal
- Financial Services
- State and Local Government
- Telecommunications
- Energy

The subsectors that AMS targets are shown in Exhibit AMS-5. AMS' business is almost wholly focused in the U.S., with less than 5% from Canada and negligible amounts from other foreign sources.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT AMS-5

AMS Submarkets

Financial Services
- Commercial banks
- Thrift institutions
- Finance companies
- Investment banks and securities firms
- Insurance companies
- Diversified financial companies

Defense
- Military services
- Defense agencies
- Aerospace prime contractors

Civilian Federal Agencies

State, Local, and Other Governments
- States and state agencies and Canadian provincial governments
- Cities
- Counties
- School districts
- Canadian government ministries

Colleges and Universities
- Universities
- Four-year colleges
- Medical centers
- Community colleges

Telecommunications
- Local telephone companies
- Long distance and international carriers
- Information services providers

Energy Companies

Major Companies in Other Industries
- Retail
- Distribution
- Consumer products

© 1990 by INPUT. Reproduction Prohibited.

5. Recent Events

The most important recent event—in fact, one of the most important events since AMS' founding in 1970—was IBM's purchase of 10% of AMS' equity for $18 million, in July 1989.

This investment was part of the IBM's 1989 web of strategic investments in vertical market and implementation firms in the information services industry, including:

- Computer Task Group
- MSA (now part of D&B)
- Policy Management Systems

In these investments, IBM has had a number of motivations:

- To tighten its links with SI partners in selected vertical markets
- To make sure that key providers of IBM mainframe solutions do not come under the control of parties hostile to IBM
- To accelerate the implementation of SAA in key application areas
- To add to the product development capabilities (both financial and technical) of its key partners

In the case of AMS, all of these IBM objectives played a role in IBM's decision.

What advantages does this investment have for AMS? The most prominent advantages for AMS include:

- Cooperative marketing with IBM selling AMS products and services
- IBM's "stamp of approval," which is still important for many large customers
- A multiyear service contract to assist IBM in software product development
- The potential for AMS to migrate its business even faster from the federal to the commercial sector
- Making an unfriendly takeover of AMS more difficult
- IBM's technical cooperation (and advance information) on improving the technical aspects of AMS' offerings (e.g., embedding CASE tools, increased DB2 efficiency, distributed data bases, and processing)

© 1990 by INPUT. Reproduction Prohibited.

6. SI Organization

AMS' organizational structure is a complex, matrixed structure, made up of a combination of geographical, functional, vertical, and project factors. For example, AMS has 45 people with the title of Vice President. The largest differences in organization are between the federal and commercial sides of the business; the commercial side is far more decentralized, as shown in Exhibit AMS-6.

EXHIBIT AMS-6

AMS Organization—Centralization & Decentralization by Line of Business

Task	Commercial		Federal	
	Cent.	Decent.	Cent.	Decent.
Strategy & Long-Range Planning		X	X	
Marketing & Promotion		X	X	X
Account Management/Sales		X		X
Contract Review/Approval	X	X	X	
Project Management/Control		X		X
Implementation/Development		X		X
Hardware/Software Acquisition	X	X	X	
Systems Operations		X		X

AMS has several subsidiaries in addition to its core organizations, including:

- AMS Management Systems Canada; this group has its own subsidiary, Loecus Informatics (a 1988 acquisition).
- AMS Technical Systems, designed to compete and manage long-term defense contracts
- Data Base Management Inc. (acquired in 1986); DBMI has its own subsidiary, The Courseware Developers. Both these subsidiaries provide consulting and education services.

© 1990 by INPUT. Reproduction Prohibited.

7. SI Business Objectives

AMS' business objectives are to meet the total information systems needs of its clients. To do this, AMS will provide packaged software, semi-customized software, custom software, consulting, systems integration services, and systems operation services.

Being a public company whose entire business is centered around the segments described here, AMS must make the SI business (broadly defined) as profitable as possible.

8. Internal SI Capabilities Evaluation

a. Business Consulting

AMS offers the following types of business consulting services:

- Planning information systems (IS) applications
- Improving business (or government) operations with computer systems technology

Generally speaking, AMS only performs business consulting that has an involvement with information services.

b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation

AMS has its own Lifecycle Productivity System (LPS) used to develop custom projects for clients. LPS is made up of a combination of third-party software and its own AMS-developed software. LPS handles all phases of the life cycle.

Part of LPS is the "CORE Foundation Software" of reusable application code modules. This helps AMS automate and control the content as well as the form of its custom applications.

c. Packaged Application Software

AMS has extensive offerings of applications software, divided into the following families of software products:

- Consumer credit management systems
- Corporate and international banking systems
- Federal financial systems
- State and local government management systems
- College and university management systems

© 1990 by INPUT. Reproduction Prohibited.

- Energy industry management systems
- Telecommunications industry management systems

As noted earlier, these application software products can be customized using AMS' own proprietary techniques.

d. Packaged Systems Software

AMS does not offer its own packaged systems software. However, as part of AMS' timesharing services—offered mainly to the federal sector—AMS does offer third-party products for use by its customers (e.g., graphics utilities and DBMS).

e. Standard Computer Hardware

AMS does not sell hardware.

f. Custom Computer Hardware

AMS does not develop custom computer hardware.

g. Network Management and Operations

AMS becomes involved in network management and operations in three primary ways:

- Through its own network, used to support its timesharing services
- Through applications that AMS has developed and subsequently operates. BureauLink is the best example of this: AMS serves as a neutral third party that manages communications and the exchange of information between the major North American credit bureaus.
- Through its products and services offered to the telecommunications industry. (See Section 4 for types of AMS customers in this segment.)

AMS, of course, develops many on-line and networked applications for its targeted customer groups.

h. Service and Repair

AMS has no significant service or repair offerings.

i. Software Maintenance

AMS has significant business in maintaining its own software products and delivered systems. In its federal business, it also maintains software written by the customer or by other contractors.

© 1990 by INPUT. Reproduction Prohibited.

9. SI Strategic Alliances

Looking into the future, the IBM alliance is AMS' principal alliance (see Section 5). In the past, AMS has teamed with a number of major contractors for specific jobs; such business partners have included GTE, McDonnell Douglas, Westinghouse, and General Dynamics. AMS has generally been a subcontractor in such relationships. INPUT expects such prime/sub relationships to continue, especially where the other partner is not a direct competitor to IBM. However, as discussed earlier, the federal business will become less important to AMS over the next several years.

AMS recently entered into a joint venture with Bell Atlantic called Bell Atlantic Systems Integration. This joint venture provides Bell Atlantic's three thousand account executives with a systems integration offering that addresses opportunities requiring information processing as well as telephone products and services.

10. SI Capabilities Summary

AMS is rich in SI capabilities:

- It is established in a number of key markets (see Exhibits AMS-1 and AMS-2).
- AMS has a proven capability of offering the full range of services needed to cover a client's SI needs.
- AMS has a good track record in implementing complex systems.

11. Marketing Strategy

INPUT expects to see both IBM and AMS benefit from their partnering strategy. AMS, especially, should find that doors are now open to it that were closed before.

Even without IBM, AMS is quite well positioned. Almost half of AMS' substantial commercial business comes from its existing client base.

AMS competes with—and often cooperates with—most of the leading federal SI players; AMS often competes as a member of a team. In the commercial sector, Andersen Consulting and, to a lesser degree, the other major accounting firms are competitors.

Because of AMS' vertical orientation, it competes against other specialists:

© 1990 by INPUT. Reproduction Prohibited.

- Firms such as Systems and Computer Technology that offer a full service approach to a particular need

- Software product firms such as Hogan or Computer Associates

12. SI Customer Base

AMS has a solid SI customer base. It has an important role in several large federal SI projects:

- Veterans Administration—Document and Imaging System
- U.S. Navy Paperless Ship—Shipboard Optical Disk Applications
- Department of the Interior—Minerals Management Service
- U.S. Navy—Naval Industrial Improvement Project

Although AMS indicates that it has participated in over 50 commercial SI projects since the beginning of 1987, its focus appears to have been more on providing professional services and tailored software than on being a prime contractor providing complete, integrated solutions. It has, however, increased its focus on commercial systems integration and will pursue a modest number of large SI projects.

13. Summary and Future Direction

AMS is one of the better-positioned SI companies, especially in commercial SI. This was no doubt a very important consideration in IBM's investment in AMS. INPUT expects to see AMS—in conjunction with IBM—mine its commercial sectors even more intensively in the future. AMS' balanced capabilities in software products, professional services, processing services, and systems operation make AMS nearly unique. (Policy Management Systems, another IBM investment, is one of the few similarly positioned companies.)

© 1990 by INPUT. Reproduction Prohibited.

K

McDonnell Douglas Systems Integration Company

1. Key SI Contact

Mr. Mark Kuhlmann
President and General Manager
McDonnell Douglas Systems Integration Company
P.O. Box 516, Mail Code 3061121
St. Louis, MO 63166

2. Description of Principal Business

McDonnell Douglas Systems Integration Company is the remaining U.S.-based information systems business of McDonnell Douglas Corporation. McDonnell Douglas Information Systems Company was officially dissolved January 1, 1990 and several of its diverse units were divested, put up for sale, or are in the process of being spun off. See Exhibit MCD-1.

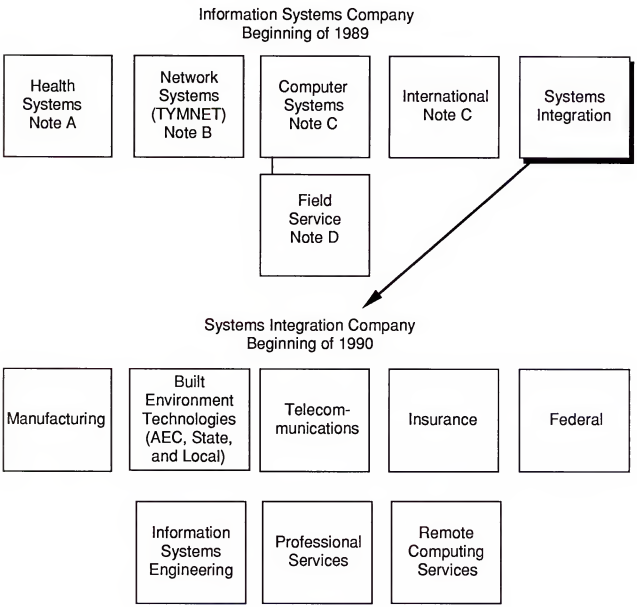
The Systems Integration Company is now a more focused business, primarily offering engineering-based products and services to manufacturing, telecommunications, state and local government, insurance, federal government, computer-aided software engineering, remote computing, and built environment technologies (architects, engineers and constructors, and infrastructure life cycle management).

McDonnell Douglas Information Systems Company at its peak had over $1 billion in revenues and about 10,000 employees. In 1989, the Systems Integration Company will have revenues of about $300 million with over 2,000 employees. After having been consistently unprofitable over six years, the Information Systems Company became profitable in the first half of 1989. About 70% of the Systems Integration Company's 1989 revenues are a result of SI activities and are divided between the commercial and federal markets, as shown in Exhibit MCD-2.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT MCD-1

McDonnell Douglas Information Systems Company Restructuring



A. Divested to American Express (3/89)
B. Divested to British Telecom (11/89)
C. Combined to become a U. K.-based company (7/89)
D. To be divested

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT MCD-2

McDonnell Douglas
Information Systems Company
1989 Systems Integration Revenues

Business Component	$ Millions
Federal	10
Commercial	200

3. Competitive Position

The Systems Integration Company's strengths are based on its ability to capitalize on McDonnell Douglas Corporation's skills and experience in engineering and manufacturing, as well as its long-term relationships with a number of key accounts in its chosen markets. The Systems Integration Company should be in a better competitive position now that McDonnell Douglas' information services offerings have been pared down to a more focused set of products and markets.

The restructuring of the Systems Integration Company may cause some uncertainty in the short run, as a direct result of the reorganizations that have given it birth, as well as the necessity that the marketplace understand the capabilities of the new McDonnell Douglas entity.

4. Markets Served

The Systems Integration Company serves the following primary markets:

- Discrete manufacturing (with focus on aerospace, automotive)
- The architects, engineers and constructors (AEC) market, and the infrastructure market in state and local government, served by the Built Environment Technologies Division.
- Telecommunications companies
- Insurance companies (primarily automated claims processing for health, property/casualty, and reinsurance)
- Federal government
- System development organizations (for CASE methodology and tools)

© 1990 by INPUT. Reproduction Prohibited.

- Professional services clients (for contract programming services)
- Remote computing customers (including systems operations)

5. Recent Events

By far the most important set of recent events has been the exit of McDonnell Douglas from much of the information services business, as described in Section 2. The result has been a much smaller and more focused organization.

6. SI Organization

The McDonnell Douglas Systems Integration Company is organized into vertical and cross-industry profit centers, as shown in Exhibit MCD-3.

EXHIBIT MCD-3

McDonnell Douglas
Systems Integration Company Profit Centers

Vertical Industries	Cross-Industry
• Manufacturing	• Information Systems Engineering (CASE)
• Telecommunications	• Professional Services
• Insurance	• Remote Computing Services
• Federal	
• Architects, Engineers, and Constructors and State and Local Government Infrastructure Management	

The cross-industry units' purpose is to support the vertical market units. However, they also provide direct services to customers:

- *Information Systems Engineering* sells CASE methodologies, tools, and training.
- *Professional Services* supplies contract programming, both through projects of other Systems Integration Company divisions and directly to commercial customers.

© 1990 by INPUT. Reproduction Prohibited.

- *Remote Computer Services* receives revenue from provides remote application processing or systems operations support, a total information service for recently acquired or divested organizations while they are in transition and often for extended periods.

7. SI Business Objectives

The Systems Integration Company's market objective is to identify and satisfy the needs of customers who require complex, often technically-oriented information systems in areas of the company's expertise. The Systems Integration Company's internal objective is to perform these tasks profitably. Profitability is a key objective, given McDonnell Douglas Information Systems' history of losses.

8. Internal SI Capabilities Evaluation

a. Business Consulting

The Systems Integration Company offers specialized technical business consulting as the front-end to its design and implementation tasks, which are the core of its offerings.

b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation

The Systems Integration Company is very strong in this area because of its STRADIS and ProKit* WORKBENCH CASE products and related services. These are used to support Systems Integration Company projects and are sold commercially (see Section 6).

c. Packaged Application Software

The Systems Integration Company offers the highly regarded UNIGRAPHICS family of interactive, three-dimensional CAD/CAM software. Applications include solid modeling, sheet metal fabrication, printed circuit board design, finite element modeling, mechanism linkage design, graphics machining, simulation, robotics, plant communications systems, numerical control tape preparation, and quality assurance.

UNIGRAPHICS runs on DEC, Data General, Hewlett-Packard (HP), Apollo, and SUN platforms.

The Systems Integration Company also offers the Graphics Design System (GDS) family of software that serves as the core of its AEC and infrastructure management systems offerings for state and local governments as well as its network engineering offerings for telecommunications.

© 1990 by INPUT. Reproduction Prohibited.

d. Packaged Systems Software

The Systems Integration Company does not offer systems software as such, outside of its CASE products.

e. Standard Computer Hardware

The Systems Integration Company's does not develop or manufacture computer equipment. Its core programs support a range of standard computer hardware like DEC, IBM, and other widely used equipment to satify its customers' requirements. UNIGRAPHICS supports most of the popular CAD/CAM platforms for the same reason (see Section 9).

f. Custom Computer Hardware

The Systems Integration Company does not provide custom computer hardware.

g. Network Management and Operations

The Systems Integration Company has not been active on a large scale in network management and operations since the sale of its TYMNET division. The Systems Integration Company is indirectly involved in networking through its work for telephone companies designing systems to support network engineering.

h. Service and Repair

After the sale of its field service business, McDonnell Douglas will rely on continuing relationships and alliances for support in this area.

i. Software Maintenance

The Systems Integration Company maintains its own software products and offers maintenance of its customized offerings.

9. SI Strategic Alliances

The Systems Integration Company has long-term marketing arrangements with most major hardware vendors (e.g., DEC, IBM, HP/Apollo, SUN), as well as selected software vendors of generalized products, such as ORACLE. The Systems Integration Company will team on bids with hardware vendors, accounting firms, and other systems integrators when required. The Systems Integration Company will subcontract where specialized skills are required. Since 1988, the Systems Integration Company has been a preferred vendor of General Motors/EDS, working to standardize CAD/CAM systems within GM.

© 1990 by INPUT. Reproduction Prohibited.

10. SI Systems Capabilities

The Systems Integration Company's core strength is its ability to develop engineering-rich, complex systems. Examples of its capabilities include:

- The UNIGRAPHICS advanced CAD/CAM product
- GDS, the Systems Integration Company's base product for managing physical infrastructure (including geographic information systems)
- The STRADIS and ProKit* WORKBENCH family of CASE methodology and tools
- Insurance core applications in automated claims handling and reinsurance
- Telecommunications core applications in network engineering and asset management, customer services/network operations, and administrative information systems

11. Marketing Strategy

The Systems Integration Company's emerging strategy is to tailor solutions for targeted niches in partnership with clients to whom it can bring proven core products and business understanding. Target niches include:

- Manufacturing companies
- AEC and public sector units with infrastructure (GIS) systems needs (e.g., transportation and environmental agencies)
- Telephone companies
- Insurance companies
- Federal customers

12. SI Customer Base

The Systems Integration Company serves over 2,000 customers with its products and services. Specific SI projects undertaken since the beginning of 1988 include three for the federal government and about 15 for nonfederal customers. Typical federal projects range from $5-10 million.

Exhibit MCD-4 shows selected recent SI projects undertaken by the Systems Integration Company.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT MCD-4

Representative McDonnell Douglas Systems Integration Company Projects

- Telecommunications Engineering and Asset Management System
  - Pacific Telesis
  - Southwestern Bell
- CAD/CAM integration with manufacturing systems
  - Kodak
- Outside Plant Records Integration
  - Bell Atlantic
- Central Artery Project—Highway/Tunnel Alignment Engineering Design
  - Massachusetts Department of Public Works
- Waste Water Treatment Facility for Boston Harbor
  - Massachusetts Water Resources Authority
- Program Administration and Execution System (PAX)
  - U.S. Army Corps of Engineers
- State Environment Agency Office Integration
  - Commonwealth of Massachusetts

13. Summary and Future Direction

The Systems Integration Company is, in a sense, a return to McDonnell Douglas' roots. INPUT expects that the Systems Integration Company will become even more focused as it builds expertise and visibility in a series of subniches, and should be an increasingly formidable competitor in its areas of focus in the future.

© 1990 by INPUT. Reproduction Prohibited.

L

NYNEX Information Solutions Group

1. Key SI Contacts

A. Theodore Engkvist
President
NYNEX Information Systems Group
4 West Red Oak Lane
White Plains, NY 10604

Dr. Gad J. Selig
Vice President & General Manager
NYNEX Information Systems Group
4 West Red Oak Lane
White Plains, NY 10604

2. Description of Principal Business

NYNEX—a combination of the former New York Telephone and New England Telephone companies—came into being as a result of the break-up of the Bell system in 1984. In common with the other regional Bell operating companies (RBOCs), NYNEX believed that in the long term it could not prosper offering only traditional, regulated telephone service.

One of NYNEX's strategic decisions was to enter the information services and software business. In 1987, NYNEX created the Information Solutions Group (ISG). One segment of ISG offers products and services developed internally by NYNEX constituents: NYNEX Computer Services Division and the NYNEX Development Company.

However, the greater part of ISG has been created via acquisition. Its major acquisitions include:

- AGS Computers (1988)
- The BIS Group (1986)
- Telco Research Corporation (1985)
- The Data Group (1985)

Section 6, below, shows the current organizational structure of NYNEX ISG units.

The different ISG business units provide NYNEX an opportunity to offer a wide range of SI services to several key vertical markets in both the U.S. and Europe.

ISG has 5,500 employees, and INPUT estimates that 1989 revenue for current ISG units was over $500 million. Only $100 million of this revenue is SI revenue (see Exhibit NYN-1); however, the majority of ISG products and services can potentially be mobilized for SI projects.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT NYN-1

NYNEX
1989 Systems Integration Revenues

Business Component	$ Millions
Federal	10
Commercial	90

3. Competitive Position

Many of NYNEX ISG's strengths flow directly and indirectly from the fact that its parent is NYNEX. NYNEX has adopted a long-term strategy to become a dominant player in the information and communications products and services marketplace. Some of NYNEX ISG's strengths are listed below:

- Because this is a strategic business area for its parent, ISG has received (and will, no doubt, continue to receive) a significant level of investment for both internal development and for acquisitions. This does not mean that ISG is not viewed as a commercial, profit-making undertaking. However, the long-term positioning of ISG will not necessarily be sacrificed to quarter-to-quarter performance targets; the pressure for short-range performance is a problem experienced by some of NYNEX's public company competitors.

- The AGS acquisition brought bulk to ISG, including offices, contracts, and professional resources. It was a similar type of thinking that, in part, prompted IBM to make its 1989 investment in Computer Task Group, one of AGS's competitors.

- ISG is able to offer a mosaic of key products and services to key business sectors:

  - The financial services sector (banking and securities) through BIS, DISC, Inc. and Vista Concepts, Inc.

  - The telecommunications sector through Telco Research, AGS, and NYNEX Development.

- NYNEX's Complex Systems Integration Group (CSIG) contracts and mobilizes NYNEX ISG resources and directs these resources to client needs and develops new systems and network integration platforms.

© 1990 by INPUT. Reproduction Prohibited.

- NYNEX's CSIG group is well-positioned to focus its SI strategies on the growing number of network integration opportunities and is doing so.

NYNEX ISG has weaknesses; these are intertwined with—in fact, almost mirror images of—its strengths:

- Its parent, NYNEX, is still legally constrained from offering several products and services that would, according to current legal doctrine, take unfair advantage of NYNEX's position as monopoly provider of communications services. The two areas in which constraints most affect NYNEX's position as a systems integrator in the U.S. are:

  - Manufacturing communications or computer hardware
  - Offering on-line remote processing of customer's data

  These constraints have only served as a minor hindrance so far. In the longer run, these barriers could create increasing problems if they remained in place; however, one school of thought believes that these legal prohibitions will be reduced or eliminated in the next few years. Since this issue is, to some extent, a political one, it is difficult to say with certainty what the outcome will be.

- A more immediate problem is that the bulk of AGS' work is essentially project-related, rather than being SI in nature. NYNEX's objective is to add increasing amounts of value-added work to AGS in order to raise its capabilities and margins. The danger is that the sheer size of AGS will tend to keep it headed in the same project-oriented direction for some time to come.

- NYNEX has significant presence in the financial services, state and local government and manufacturing vertical markets. However, NYNEX has a much lower level of expertise and more limited product offerings in most other verticals. This situation contains two problems:

  - NYNEX will find it harder to break into other markets without additional acquisitions.

  - If the banking and brokerage sectors should themselves run into financial difficulties, NYNEX could be disproportionately affected.

- The NYNEX SI strategy is dependent on internal and external resources being orchestrated both on an ongoing (strategic) basis and for specific (tactical) SI jobs. This is difficult enough in any multi-divisional organization where different units have their own goals and schedules. This task is even more difficult in an organization that is built up through a number of different acquisitions, each with its own culture and method of operations.

© 1990 by INPUT. Reproduction Prohibited.

In summary, NYNEX's problems are also its opportunities, and vice versa. That the problems inherent in NYNEX's strategy were evident from the beginning is grounds for optimism about NYNEX's approach. NYNEX has a strong management group that is working to take advantage of its position in the market.

4. Markets Served

NYNEX ISG is particularly strong in the U.S., where INPUT estimates it receives over two-thirds of its revenues. BIS gives NYNEX a well-placed European position in its areas of expertise and has provided NYNEX with a position and operating units along the Pacific Rim.

NYNEX is exceptionally strong in the financial services markets, with its software and services offerings by BIS, Vista Concepts, and DISC, as well as AGS' professional services experience in this area.

Telco Research, NYNEX Development, and NCSIG give ISG special telecommunications experience and business entrée.

AGS has manufacturing communications software as well as professional services experience in factory systems; however, NYNEX ISG does not yet have manufacturing sector experience that is nearly as deep as its financial sector experience.

5. Recent Events

As noted above, NYNEX ISG has grown largely through acquisition. Acquisitions are made by NYNEX ISG itself, as well as through its AGS subsidiary, depending on how the acquisition will fit into ISG's overall business.

Examples of this strategy are two 1989 acquisitions by NYNEX's AGS Information Services:

- In July, AGS bought Multiple Technologies, a 200-employee, Michigan-based professional services firm specializing in the discrete manufacturing sector.

- In November, AGS acquired TELO Technologies, previously a subsidiary of Tampa Electric. TELO offers products and services to the utility industry.

This appears to be part of a pattern where small and/or lower value-added acquisitions are folded into AGS, rather than being maintained as separate entities or added to CSIG.

© 1990 by INPUT. Reproduction Prohibited.

6. SI Organization

NYNEX ISG has 19 operating entities that are organized into seven operating units, as shown in Exhibit NYN-2. The NYNEX Complex Systems Integration Group (CSIG) is the chief vehicle for providing SI services, as its name would imply. CSIG typically serves as a general contractor, calling in resources from the other units of ISG, other parts of NYNEX, other subcontractors, and long-term or single-project partners. Services that CSIG provides are shown in Exhibit NYN-3.

The competencies of the other ISG units are briefly described below:

- *AGS Information Services*—Provides professional services to over 1,000 clients, largely through the design and implementation of custom information systems. AGS has expertise across many functional and vertical areas.
- *AGS Management Systems*—Provides project management software and system development methodologies
- *DISC*—Provides cash management, account reconciliation, and regulatory compliance software to U.S. banks
- *Systems Strategies*—Provides UNIX-to-IBM and VAX-to-IBM communications software
- *Vista Concepts*—Provides securities processing and trust accounting software
- *Eastern Design Company*—Supplies engineering and technical personnel
- *EDC Temps*—Supplies temporary office personnel
- *BIS Banking Systems*—Provides international banking software and services
- *BIS Applied Systems* and *BIS Beecom*—Provide professional services in the U.K.
- *BIS Mackintosh, BIS Shrapnel,* and *BIS CAP*—Provide consulting and market information to the information services industry
- *Christian Brann* and *Contact 24*—Provide direct marketing services in the U.K. and Australia
- *The DATA Group*—Provides software and services to customer services organizations

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT NYN-2

NYNEX Information Solutions Group, Inc. Organization

- NYNEX Complex Systems Integration Group
- AGS Computers, Inc.
  - AGS Information Services, Inc.
  - AGS Management Systems, Inc.
  - DISC, Inc.
  - Systems Strategies Inc.
  - Vista Concepts, Inc.
  - Eastern Design Company, Inc.
    - EDC Temps, Inc.
- The BIS Group Ltd.
  - Banking Systems
    - BIS Banking Systems Ltd.
  - Information Systems
    - BIS Applied Systems Ltd.
    - BIS Beecom International Ltd.
  - Marketing Information
    - BIS Mackintosh Ltd.
    - BIS Shrapnel Pty. Ltd.
    - BIS CAP International
  - Direct Marketing
    - Christian Brann Ltd.
    - Contact 24 Ltd.
- The DATA Group Corporation
- NYNEX Computer Services
- Telco Research Corporation
- NYNEX Development Company

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT NYN-3

NYNEX Complex Systems Integration Group Services Offered

- Consulting
  - Business strategy
  - Systems and communications needs analysis
  - Information/communications systems planning
  - Technology assessment
  - Equipment and systems evaluation and selection
  - Feasibility studies and RFP evaluation
  - Information/communications systems organization audits
- Systems and Network Design and Development
  - Prime contractor
  - Systems/network design, engineering, and development
  - Hardware, software and network integration
  - Custom software, development
  - Integrated network management systems
  - Systems integration development tools and methodologies
  - Local-area/metropolitan-area networks
- Systems Implementation
  - Project management
  - Contract management
  - Procurement, prototyping, testing
  - Documentation
  - Conversion
- Public and Private Training and Education
  - User skills
  - Technical seminars
  - Executive awareness seminars
  - Development skills
- Systems/Network Operation
  - Facility/network management
  - Technical support
  - Customer support
  - Maintenance
- Systems Re-Engineering
  - Maintenance
  - Redesign
  - Tools

© 1990 by INPUT. Reproduction Prohibited.

- *NYNEX Computer Services*—Provides professional services and video information services integration

- *Telco Research*—Provides call accounting software and professional services

- *NYNEX Development Company*—Develops new business opportunities. Currently developing products and services in LAN integration, integrated network management, and electronic funds transfer

7. SI Business Objectives

NYNEX's principal business objectives are:

- To obtain profitable business
- To control its account base
- To strengthen its non-SI business

Less important are follow-on hardware sales and follow-on systems operations contracts—which is reasonable, given its current legal constraints. NYNEX ISG is continuing to target a 25% compound annual growth rate and to increase margins. It has been getting half of its SI business from current accounts and half from new accounts.

8. Internal SI Capabilities Evaluation

a. Business Consulting

CSIG offers business consulting directly as part of its front-end value-added services. BIS Applied Systems also offers business consulting as well as BIS Banking Systems in its focused area of expertise.

b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation.

AGS Management Systems offers a series of software packages for project management as well as a system development methodology. BIS offers the Integrated Programming Support Environment (IPSE) package.

c. Packaged Application Software

Different operating units of ISG offer extensive applications packages, as described in Section 7, above.

© 1990 by INPUT. Reproduction Prohibited.

d. Packaged Systems Software

Systems Strategies offers the connectivity software previously described.

e. Standard Computer Hardware

NYNEX does not generally offer standard computer hardware. One of the few exceptions is hardware and software from the DataMyte Corporation used in AGS Information Systems' factory data collection offering.

f. Custom Computer Hardware

NYNEX does not develop customized hardware.

g. Network Management and Operations

Given NYNEX's principal business, it is not surprising that network-oriented products and services are threaded into many of the offerings of ISG units:

- CSIG: Integration services
- AGS: Extensive development services
- Systems Strategies: Connectivity products
- Vista Concepts: On-line trading systems
- NYNEX Computer Services: Consulting
- Telco Research: Products and consulting for telecommunications management
- NYNEX Development: Local-area network (LAN) integrated products and services

h. Service and Repair

Services and repair are not offered by ISG but are offered by another NYNEX affiliate, NYNEX Business Centers.

i. Software Maintenance

Maintenance is offered as a standard part of NYNEX's various software products and is offered by the professional services units as a separate service to clients.

© 1990 by INPUT. Reproduction Prohibited.

9. SI Strategic Alliances

The NYNEX Corporation has many strategic alliances, ranging from telecommunications enterprises (e.g., France Telecom, Northern Telecom, Singapore Telecom) to relations with suppliers of its computer store division.

NYNEX ISG has loose reselling alliances with IBM, DEC, Stratus, and Tandem. None of these are exclusive or particularly close relationships. In Tandem's case, for example, NYNEX was the ninth integrator with which Tandem formed a reselling arrangement (others included BCS, EDS, SHL, SAIC, and GTE). NYNEX also has relationships with the leading on-line transaction processing hardware companies and inter-LATA carriers like MCI, AT&T, Telenet, and Tymnet.

10. SI Capabilities Summary

NYNEX ISG has an exceptionally wide range of products and services that it can marshall under its SI umbrella. In addition, the NYNEX Complex Systems Integration Group can use other parts of NYNEX, subcontract, or form alliances with other vendors to bid and win systems and network integration contracts.

11. Marketing Strategy

NYNEX ISG's marketing strategy is to build on its strong presence, including:

- The NYNEX Corporation's industry, systems, and network experience
- ISG's position in financial services, utility, manufacturing, and state/local government markets
- The market positions of AGS, BIS and Telco Research
- Growing focus on network integration (including complex LANs, metropolitan-area networks (MANs), and network operations management)

Being already strong in these diverse areas will allow ISG and its CSIG unit to directly attack the SI marketplace.

NYNEX's competitors exist on two levels:

- Andersen, CSC, IBM, and EDS for large, complex SI projects
- Computer Task Group and other value-added professional services firms for less complex SI jobs

© 1990 by INPUT. Reproduction Prohibited.

12. SI Customer Base

NYNEX indicates that since 1987 it has worked on 15 commercial SI jobs with an average contract value of $25 million. NYNEX has not been involved in any significant U.S. federal SI projects, as its focus from the beginning has been on commercial and international markets.

13. Summary and Future Direction

INPUT believes that the near-term future of NYNEX's SI efforts will have these characteristics:

- Focus on contracts with high network integration content
- Further increase in the synergies between the different ISG units
- Selective acquisitions to increase its capabilities in targeted markets

NYNEX is obviously in SI (and information services) for the long haul. Other SI firms should expect NYNEX to be an even more aggressive competitor in the future.

© 1990 by INPUT. Reproduction Prohibited.

M

Science Applications International Corporation

1. Key SI Contacts

J.R. Beyster
Chairman and CEO
10260 Campus Point Drive
San Diego, CA 92121

Federal

James E. Russell
Vice President
1710 Goodridge Drive
P.O. Box 1303
McLean, VA 22102

Commercial

Joseph P. Walkush
Vice President
10210 Campus Point Drive
San Diego, CA 92121

2. Description of Principal Business

Science Applications International Corporation (SAIC), founded in 1969 as Science Applications, Inc., offers diversified research and engineering services as its primary product, with the researchers and managers themselves owning the company. The company offers technical and professional services in the fields of national security, energy, and environment and health. SAIC is also involved in the custom assembly of special-purpose computer systems and the manufacture of certain high-technology products.

Total fiscal 1988 revenue reached $693.7 million, a 16% increase over fiscal 1987 revenue of $599.7 million. Net income rose 20% from $18 million in fiscal 1987 to nearly $21.6 million in fiscal 1988. Fiscal 1989 revenues rose to $865 million, $360 million of which were from systems integration, as shown in Exhibit SAI-1.

Exhibit SAI-2 provides revenue estimates for the past six years. During this period, SAIC has shown remarkable revenue growth, averaging a compound annual growth rate (CAGR) of almost 20%. It has been estimated that 85% of this revenue comes from the federal government.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT SAI-1

SAIC
1989 Systems Integration Revenues

Business Component	$ Millions
Federal	330
Commercial	30

EXHIBIT SAI-2

SAIC Historical Revenue

Year	Revenue ($ Millions)	Percent Increase
1984	354	22
1985	420	19
1986	533	27
1987	600	13
1988	694	16
1989	865	25

3. Competitive Position

SAIC started out as a defense contractor and has continued to support the Department of Defense (DoD) in a variety of classified and unclassified projects. In 1984, the company was selected as one of the ten system architects for the Strategic Defense Initiative.

In recent years, SAIC has branched out in a variety of federal areas, and these projects are expected to provide the basis for a commercial SI business. The most obvious example is SAIC's pursuit of business in hospital information systems. In 1986, SAIC won the contract for Stage I of what was originally called the Tri-Service Medical Information System (TRIMIS). This contract, valued at $27.3 million, covered the design and development of a medical information system for military hospitals.

Stage II, valued at just over $1 billion, was awarded in 1988. It covers implementation and follow-on support of what is now referred to as the

© 1990 by INPUT. Reproduction Prohibited.

Composite Health Care System (CHCS). SAIC is using this project as a foundation for commercial hospital support.

In October 1989, SAIC acquired Di-Star Medical Systems Corporation, its principal subcontractor on CHCS. It had previously acquired the Software Products Division of Control Data Corporation. Using these two groups as well as other internal resources, SAIC developed its own product line for medical information named "SAIC-Care." As a result, INPUT expects SAIC to become a major force in commercial medical hospital systems, possibly even the leading systems integrator in that vertical industry.

SAIC is expected to repeat this approach in other areas. For example, it is now pursuing SI work for local television stations around the country, based on a successful project at a Chicago station. Rather than treating SI in a global sense, SAIC is pursuing discrete SI opportunities in those vertical industries in which it already has both experience and qualifications. Using this as a base, it will then expand to other related industry sectors.

4. Markets Served

As already noted, SAIC services primarily the federal market, principally the DoD. In addition to the CHCS, described above, the following represents a partial list of other SI projects that SAIC is doing:

- FBI Automated Fingerprint Identification System
- Department of Energy Licensing Support System
- Sacramento Air Logistics Center
- Mid-Eastern Command, Control, and Communications System

SAIC classifies its business into two segments as follows:

- Technical services, which relate to national security and to energy, environment, and health include:
  - Design, development, and analysis related to defense policies, high-technology research, computer software and systems, tactical and strategic operations systems for military organizations, support, and manpower training programs
  - Research, analysis, engineering, technical services, software, and systems for government agencies and industrial customers related to nuclear energy, alternative energy sources, and a range of environmental studies, as well as health and human development programs

© 1990 by INPUT. Reproduction Prohibited.

- Production of custom-designed and standard products—such as data display devices, sensors, and prototype instruments—under contract for government agencies and industrial customers. These products incorporate SAIC-developed hardware and hardware manufactured by others.

Exhibit SAI-3 presents a three-year summary of revenue by business segment.

EXHIBIT SAI-3

SAIC

Three-Year Source of Revenue Summary ($ Millions)

Item	Fiscal Year					
	1988		1987		1986	
	Revenue $	Percent of Total	Revenue $	Percent of Total	Revenue $	Percent of Total
Technical Services - National Security	445.5	64	405.2	68	361.7	68
-Energy, Environment, and Health	187.3	27	147.2	25	132.1	25
Products and Other	57.8	8	44.9	7	35.4	7
Interest Income	3.1	-	2.3	-	3.5	-
Total	693.7	100	599.7	100	532.7	100

In its own promotional material, SAIC lists the following business areas:

- National security
- Energy
- Environment and health
- High-technology products
- Telecommunications and networking
- Computer software

The SI projects that SAIC takes on include most of these business areas.

© 1990 by INPUT. Reproduction Prohibited.

5. Recent Events

In September 1989, SAIC hired Gordon E. Myers to serve as a senior vice president supporting systems integration and software development. Mr. Myers joined SAIC after a distinguished 20-year career at IBM. Most of Mr. Myers' experience has been in the federal area, although in his last position he managed the Commercial Solutions Development (CSD) organization of IBM's Systems Integration Division. His appointment signals a new emphasis by SAIC on systems integration.

In June 1989, SAIC won the contract to provide a new private data network to the Department of Veterans' Affairs. The project, valued at $8.4 million over ten years, is called the Integrated Data Communications Utility (IDCU). SAIC will provide project management, systems integration, and tailored software. Its subcontractor, U.S. Sprint, will provide the network technology, customer premises equipment, transmission manufacturing, and necessary field support. Initial installation is expected to be completed within two years.

6. SI Organization

In general, SAIC functions on a decentralized basis. It consists of around 100 profit centers, most of which reside in seven major organizations that SAIC refers to as sectors. Skills for SI projects can be found in many of the profit centers and sectors. The major sectors are:

- Advanced Technology and Analysis Sector
- Aerospace and Defense Sector
- Military Sciences/Information Systems Sector
- Science and Engineering Sector
- Space Energy and Environment Sector
- Systems Applications Technology Sector
- Systems, Software, and Telecommunications Sector

In support of its SI strategy, as well as to expand its business base in certain niche markets, SAIC has made several acquisitions over the past few years. Current subsidiaries include:

- American Systems Engineering Corporation
- AMEX Systems, Inc.
- Bull, Inc.
- Carl T. Jones Corporation
- La Jolla Research & Business Associates, Inc.
- SAIC Architects, Inc.

SAIC has almost 2,000 employees working full-time on SI, with another 500 assigned to specific SI projects on an as-needed basis. This represents one-quarter of SAIC's total employee count of approximately

© 1990 by INPUT. Reproduction Prohibited.

10,000. Approximately 90% of those working on SI projects support federal clients.

7. SI Business Objectives

SAIC identifies three objectives that guide its overall activities:

- Technology leadership: SAIC was founded on a base of high-technology work, and it continues to pursue this business. More than 60% of SAIC's professional staff have degrees in science or engineering, with 13% holding Ph.D.s and 34% Master's degrees.

- Nationally significant programs: SAIC seeks to participate in highly-visible programs that make a difference. This represents a high-risk, high-reward strategy, since one major "crater," even if it is not SAIC's fault, can have an adverse impact on the company's reputation.

- Employee ownership and participation: Nearly 50% of SAIC's employees own stock in the company. This encourages many employees to take a more global view of company matters, rather than focusing on individual activities.

These business objectives translate into SI objectives by emphasizing the high-technology capabilities of its personnel in solving complex customer problems. These personnel, in taking a global view and calling on extensive available in-house resources, manage the risk inherent in large SI projects.

As noted earlier, SAIC is expanding its presence in those niche markets that it has penetrated, rather than penetrating new markets. This further minimizes risk and counteracts the risks associated with undertaking nationally significant programs.

8. SI Capabilities Summary

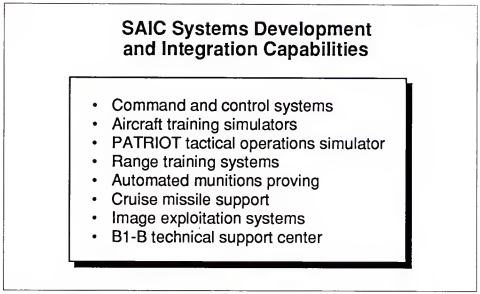
SAIC has a very broad base of SI capabilities, which should make it a formidable competitor in the 1990s. Exhibits SAI-4a through 4e list key qualification areas and some notable projects in those areas. This wide range of experience and capabilities will enable SAIC to capture a greater share of the commercial SI market.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT SAI-4a

SAIC Technology Development and Analysis Capabilities
• SDI simulation laboratory
• Theater missile defense architecture
• Surveillance/electro-optics technology
• Automated nuclear force planning
• Army model development/evaluation
• Submarine/antisubmarine warfare
• Nuclear weapons effects
• Seismic analysis
• Center for target studies
• Ada technology
• Artificial intelligence

EXHIBIT SAI-4b


SAIC Systems Development and Integration Capabilities
• Command and control systems
• Aircraft training simulators
• PATRIOT tactical operations simulator
• Range training systems
• Automated munitions proving
• Cruise missile support
• Image exploitation systems
• B1-B technical support center

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT SAI-4c

SAIC Technical Support Services Capabilities

- Sacramento Air Logistics Center modernization program
- Meteorology engineering services
- Training systems
- Ada software engineering
- Information systems design
- Strategic air command C3 support

EXHIBIT SAI-4d

SAIC Energy Systems Integration Capabilities

- Plant process computer upgrades
- Emergency response systems
- Utility replacement systems
- Oil pipeline control systems
- Systems engineering

EXHIBIT SAI-4e

SAIC Capabilities— Other Fields of Concentration

- Military medical information systems
- Mainframe systems software
- NASA independent validation and verification tools
- Computer transaction security
- Automated luggage inspection systems
- Portable imaging computer
- Flight data recorder software support

© 1990 by INPUT. Reproduction Prohibited.

9. Integrated SI Capabilities Evaluation

For a company that is relatively little known in the commercial environment, SAIC can bring remarkable capabilities to commercial SI projects. It counts more than 100 companies among its commercial clients, ranging (in alphabetical order) from Aerojet Corporation to Zapata Offshore Company. In most cases, these clients receive products and services other than SI. However, the clients represent an excellent base to which SAIC can sell its SI services.

SAIC has developed successful SI policies and procedures with many of its hundreds of federal clients. As a result, SAIC has become a major participant in the federal SI market. INPUT now expects SAIC to apply this expertise to the commercial market and become a major force there also.

10. SI Strategic Alliances

In bidding on federal SI contracts, SAIC has chosen a variety of teaming partners to suit its needs. For example, on the Composite Health Care System, SAIC chose Digital Equipment Corporation (DEC). This was an obvious choice, since most of the required applications software modules already ran on DEC equipment. For the Department of Veterans' Affairs' IDCU, SAIC chose Telenet Communications Corporation as its leading subcontractor.

However, SAIC has chosen IBM Corporation for its most strategic alliance. It has worked closely with IBM in both commercial and federal SI projects. It also has a marketing assistance program agreement with IBM and has performed systems software development for IBM for the past nine years.

INPUT expects this relationship to continue as SAIC pursues the commercial SI market. However, when it makes more sense to team with other firms, SAIC will not hesitate to do so.

11. SI Marketing Strategy

Currently, SAIC obtains nearly 80% of its commercial SI business from its existing client base, as opposed to only 50% of its federal SI work. INPUT expects this pattern to change gradually, as SAIC increases its pursuit of new commercial SI clients. SAIC will also emphasize those integration components in which it can realize the highest margins, including

- Customized hardware and software
- Consulting, design, and integration
- Custom software development

© 1990 by INPUT. Reproduction Prohibited.

SAIC applies five selection criteria in deciding which projects to pursue:

- Growth programs: projects that are either large themselves or are likely to grow into large engagements
- Large value-added component: projects that involve much custom design, development, or consulting, and that will result in higher profit margins.
- Customer/program knowledge: projects that support either a current SAIC customer or involve a program already well-known to SAIC
- Similarity to previous work: projects that can be accomplished in a manner similar to other projects already completed by SAIC
- Risk: projects that, for whatever reason, represent a reduced, although not minimal, risk to SAIC

Although SAIC uses typical marketing approaches, including public seminars and direct mail, these are not especially effective. SAIC accomplishes its best marketing through client referrals and direct marketing efforts. Thus, for SAIC, good performance and current project results will yield the most beneficial marketing for the company.

12. SI Customer Base/Specific Projects

As indicated in Section 4, SAIC primarily supports federal clients in its SI activities. In 1989, nearly 90% of SAIC's SI revenues came from the federal market. As indicated earlier, SAIC has taken several steps to reposition itself and take advantage of commercial SI opportunities.

Sections 4 and 8 provide numerous examples of federal SI activities, as well as a few commercial activities, notably in the energy field.

13. Summary and Future Directions

In summary, SAIC has effectively penetrated the federal SI market, and INPUT expects SAIC to increase its role in this growing market. However, federal budget constraints and the high level of competition will inhibit SAIC's growth.

INPUT expects the greatest change to occur in the commercial SI market. Although SAIC has established a commercial presence through various specialized products and services, it is just now beginning to pursue commercial SI. SAIC will likely succeed in this market also. INPUT expects that, within three to five years, SAIC will be a much more important participant in the commercial SI market.

© 1990 by INPUT. Reproduction Prohibited.

N

Boeing Computer Services

1. Key SI Contacts

Michael R. Hallman
President
Boeing Computer Services
2810 160th Avenue, S. E.
Bellevue, WA 98008

O. M. Landahl
Vice President/Deputy Manager
Information Services
2810 160th Avenue, S. E.
Bellevue, WA 98008

R.M. Little
Vice President/Deputy Manager
Information Services
10800 Parkridge Boulevard
Reston, VA 22091-5418

Federal

George Coulbourn
General Manager
Government Business Development
10800 Parkridge Boulevard
Reston, VA 22091-5418

Commercial

Doug Smith
General Manager
Commercial Information Services
2810 160th Avenue, S.E.
Bellevue, WA 98008

2. Description of Principal Business

Boeing Computer Services (BCS), a division of the Boeing Company, supplies computing and communication resources and information services to all Boeing operating divisions, and to more than 1,500 government and commercial customers worldwide.

BCS was established in May 1970 to consolidate 13 separate computing organizations within Boeing. The division began with about $250 million worth of computing equipment and a staff of 2,700.

© 1990 by INPUT. Reproduction Prohibited.

Today, BCS employs more than 13,000 people located throughout the U.S. and other countries, and manages approximately $1.4 billion worth of company-owned computing and telecommunications equipment.

BCS is currently divided into two major groups:

- Information Services—BCS' current noncaptive business focuses on providing strategic systems development and integration products and services to government and commercial clients. The division also provides network integration and management products and services, document and image management products and services, remote computing services (including supercomputing), systems operations services, consulting services, packaged software products, and education and training services.

- Boeing Support Group—Over $1.1 billion in information services support is supplied annually to the Boeing Company and its operating divisions by the Boeing Support Group (BSG). The Advanced Technology Center, which has been a pioneer in areas such as artificial intelligence and supercomputing, is also managed by BSG.

In 1989, BCS realized significant revenues from its systems integration (SI) business, focused mainly on the federal market, as shown in Exhibit BCS-1. The company also positioned itself in the commercial SI market. BCS' 1989 noncaptive revenue is estimated at approximately $360 million, a 30% increase over estimated 1988 noncaptive revenue of $275 million.

EXHIBIT BCS-1

BCS
Systems Integration Revenues, 1989

Business Component	$ Millions*
Federal	215
Commercial	35

*Estimated

3. Competitive Position

Boeing Computer Services has significant strength in a number of areas that include systems and network design, integration, and management. One of BCS' key strengths is its ability to draw upon a highly technical staff of approximately 13,000. Areas of technical specialization include:

© 1990 by INPUT. Reproduction Prohibited.

- Systems design, integration, and management
- Network design, integration, and management
- Document management
- Image processing
- Artificial intelligence
- Supercomputing
- Facilities management and systems operation
- Program planning, management, and control
- Education and training

As a provider of SI services, BCS has a strong computer services base and a broad base of skills from which to draw. See Exhibit BCS-2. BCS is also strong in applied research, such as the application of artificial intelligence. BCS is able to demonstrate many of these skills through its Telecommunications Management Center, data centers, and nationwide networks.

EXHIBIT BCS-2

BCS Strengths and Weaknesses

Strengths

- Broad computer services base
- Broad network services base
- Broad skills base
- Strong project management base
- Strong applied research

Weaknesses

- Historical federal focus
- Historical parent company focus

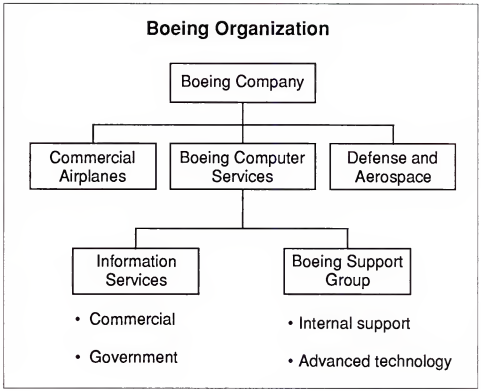
Early in its history, BCS became a major player in the commercial timesharing market. Next, the company placed emphasis on becoming a major participant in the federal integration programs arena, while at the same time deemphasizing its interest in the commercial marketplace. Reorganization of the division in 1989 has shifted resources to building the commercial systems integration business into a major contributing

© 1990 by INPUT. Reproduction Prohibited.

entity. To date, BCS' commercial activity has been limited to key vertical market niches such as aerospace and state and local government. However, the company has recently branched out into new areas, including transportation, electronics, and utilities.

The president of BCS has always reported directly to the president of Boeing. A 1989 reorganization of the defense and aerospace businesses within Boeing reduced the number of executives who report directly to the Boeing president. The current Boeing organizational structure in shown in Exhibit BCS-3. This structure allows the BCS division even more visibility within the corporate structure and shows the high-level strategic importance of BCS, both internally within Boeing and externally as a commercial enterprise.

EXHIBIT BCS-3



4. Markets Served

Approximately 85% of BCS' 1989 noncaptive revenue was derived from the federal government, and 15% from commercial clients. Noncaptive revenue excludes that derived from the parent company, which is BCS' principal customer. Within the government, BCS pursues business—including SI, support services, and telecommunications business—for the Department of Defense, NASA, and various civilian agencies. Commercial revenue comes primarily from the manufacturing, energy, and transportation industries, state and local government, and from cross-industry applications. New vertical markets, including pharmaceuticals, financial services, and electronics, are evaluated in response to market demand.

© 1990 by INPUT. Reproduction Prohibited.

BCS operates six major data centers. Four of the data centers—Kent, WA; Wichita, KS; Philadelphia, PA; and Huntsville, AL—principally support Boeing operations at those locations. The fifth, located in Bellevue, WA, supports both Boeing and commercial customers, and the sixth, in Vienna, VA, serves the federal government. All centers and offices are linked by one of the largest privately owned telecommunications networks in the world.

5. Recent Events

To build on its success in the federal market and to increase federal business, Boeing has expanded its Vienna, VA headquarters and added 12 additional executive positions. While the additional building is being constructed, BCS has temporarily leased additional office space in nearby Reston, VA. BCS is currently pursuing two major SI contracts:

- HUD's Integrated Information Processing Services (HIIPS)
- The Department of State Telecommunications Network (DOSTN)

In a move to increase its penetration of the European market, BCS has signed a new distribution agreement with GEC, England's largest engineering and electronics company. The agreement covers BCS' Product and Process Document Management (PPDM) software. Tandem Computers is also a participant in the arrangement.

BCS also recently won a contract to maintain the Commonwealth of Pennsylvania's data communications network. The three-year contract was awarded through a recompetition of an earlier contract won by Boeing, which included the design and implementation of the multiagency state network.

6. SI Organization and Staffing

Exhibit BCS-3 illustrates the Boeing organization. BCS is divided into two major groups: the Information Services group, which handles systems integration for external customers and is further divided into Government Business Development and Commercial Information Services; and the Boeing Support Group, which handles systems integration for the Boeing Company.

The Information Services group provides strategic systems development and integration products and services to government and commercial clients. The division also provides network integration and management products and services, document and image management products and services, remote computing services (including supercomputing), systems operations services, consulting services, packaged software products, and education and training services. Approximately 3,000 employees are active in this group, and further resources are drawn from the Boeing Support Group and other Boeing divisions.

© 1990 by INPUT. Reproduction Prohibited.

Over 7,000 employees in the Boeing Support Group directly support the computing and telecommunications needs of the Boeing Company and its operating divisions. The Advanced Technology Center, which performs research in areas including artificial intelligence, software engineering, and high-speed processing, is part of the Boeing Support Group.

7. SI Business Objectives

INPUT believes that BCS' strategic direction will be closely aligned with its areas of strength. Specific emphasis will be placed on opportunities requiring extensive systems and network integration, large computing facilities, and highly sophisticated, high-speed systems. The company will support these services by developing integration tools in areas such as network management and document/image management.

In shifting its attention from its traditional business areas, BCS has taken several steps:

- BCS has refocused its concentration from timesharing (a flat business) to systems integration, network integration, network management systems, document management systems, systems operations, and other areas of strategic importance to customers' businesses.
- BCS is emphasizing a value-added systems integration approach that also serves as an umbrella for its other products and services.
- BCS is focusing its software development efforts on value-added integration and management software that is not currently available in the marketplace—for example, the Product and Process Document Management (PPDM) software and the Integrated Network Management System (INMS) software.
- BCS is developing key alliances in product development and marketing with hardware vendors, telecommunications carriers, and consultants.
- BCS has instituted organizational changes to increase the visibility of the Information Services group within the company and to facilitate expansion into new markets.
- BCS has realigned its commercial systems integration activities to pursue and penetrate this growing market.

8. SI Capabilities Summary

Boeing's capabilities lie primarily in systems and network management and integration, systems operations, project management, and computer services. As a systems integrator for the Boeing Company, BCS has designed and implemented the Boeing Telecommunications Management Center (TMC).

© 1990 by INPUT. Reproduction Prohibited.

In late 1987, Boeing had five network control centers. Today, they are all consolidated in one centralized, real-time network management center. During 1989, the TMC monitored 17 complex networks, 13 major sites, 4,000 data circuits, 30 strategic switches, 110,000 switched lines, and 11,900 interconnect trunks. BCS is also completing a $100 million modernization of Boeing's nationwide private voice network.

BCS' array of proprietary software products also increases its ability to capture SI work. For example, the Boeing Integrated Network Management System (INMS) caters to the varying technologies of many different vendors, so customers can use INMS with their existing baseline equipment as well as with new equipment. The Boeing Product and Process Document Management System (PPDM) can serve as a base for complex systems integration and management that includes large-scale image processing. Boeing's Contract Management Family includes proposal pricing, project management, estimating, scheduling and program history components, and also supplies the Executive Information Services (EIS) application development language tool. The company's line of scientific and engineering software also supplies customers with tools that enhance their system capabilities.

Boeing also remains active in traditional timesharing and supercomputer services. The company's MAINSTREAM Access services offer scientific and engineering customers a broad range of computing capabilities, including CRAY XMP/24 supercomputing processing, CDC CYBER and IBM systems processing, and gateway access service. These services are supplied through Boeing's data centers in Vienna, VA and Bellevue, WA. BCS also provides customers with facilities management services.

BCS strengths include requirements analysis and definition, systems architecture and design, facilities planning and management, network design and management, education and training, and project management.

9. SI Capabilities Evaluation

BCS has extensive capabilities dispersed throughout its organization. A 1989 reorganization resulted in a staff dedicated solely to commercial systems integration opportunities. This indicates the company's serious intent to establish a strong presence in the commercial systems integration market.

a. Consulting/User Requirements Analysis

BCS has strong technical and project management skills in consulting, particularly in the design and use of supercomputers, the design and management of large data center operations and networks, the manage-

© 1990 by INPUT. Reproduction Prohibited.

ment of documents, and the integration of manufacturing systems. The company does not bill itself as a business or management consulting firm per se, but it does provide these services as part of a total systems integration assignment.

b. Design/Integration

BCS has excellent skills in the design and integration of complex systems, including centralized and decentralized information processing as well as telecommunications that serve a large number of geographically dispersed users. Boeing's base of computer and telecommunications equipment is quite diverse. In 1989 the company had approximately 84,000 computer workstations, 500 minicomptuers, and 50 mainframes running on a multitude of local- and wide-area networks. The Boeing communications network is monitored through a central Telecommunications Management Center (TMC) that encompasses 17 complex networks and 13 major sites.

c. Project Management

BCS has developed a proprietary project management system that is comprehensive and is geared to large, complex projects. The Boeing Company's success in the commercial airplane business is due in large part to its skills in complex project management.

d. IS Hardware

BCS neither develops nor manufactures IS equipment. Over the years the company has worked with a multitude of vendors and has developed methods to objectively screen and select the best vendor for a particular job. Few organizations are able to work as successfully with large systems as BCS. BCS has developed extensive skills and expertise in implementing both mainframe-based systems and complex distributed networks.

e. Communications Hardware

While not a manufacturer of communications equipment, BCS has a solid base of knowledge in its application. The company has worked with a multitude of vendors and has developed methods to objectively screen and select the best vendor for a particular job. The company has developed and managed extensive networks both internally and for clients.

f. Software Development

BCS has a broad skill base and wide experience in software development. The company's present emphasis is on software that adds value to its systems and network integration work. Examples include the Integrated

© 1990 by INPUT. Reproduction Prohibited.

Network Management System (INMS) and the Product and Process Document Management System (PPDM). The company also continues to market specialized engineering and scientific applications and contract management software.

g. Application Software

As noted in the previous section, BCS develops application software that adds value to its systems and network integration work.

h. Systems Software

BCS has a broad base of skills to develop systems software and has developed such software for use in its remote processing environment. It does not currently develop and market packaged systems software for use on client systems.

i. Education, Training, Documentation

BCS has strong skills in education and training, with a large organization dedicated to providing training services for Boeing staff and as a commercial offering. In addition to packaged courses, BCS will design courses to meet specific client needs.

j. Service and Repair

BCS provides service and repair to the corporation. As part of a systems integration and operations project, BCS will manage maintenance services for clients.

10. SI Strategic Alliances

Several recent strategic alliances, summarized in Exhibit BCS-4, are indicative of BCS' short- and long-term focus.

- Through an alliance with Tandem Computers, Inc., BCS is developing a strategic document management product (Product and Process Document Management System—PPDM) that will run on the Tandem platform. Target markets include manufacturing and pharmaceuticals, as well as other vertical markets where Tandem or Boeing have strength, including transportation, finance, and utilities. The Boeing PPDM software will be marketed by the Tandem sales organization.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT BCS-4

BCS Strategic Alliances

Vendor	Purpose
Tandem Computers	Document management software
NEC	Integration Network Management Software (INMS)
IBM	SI partner
U.S. West	Network integration partner
Honeywell	High-speed circuitry and supercomputer development
Scientific Computer Systems	Operating systems software

- A distribution agreement with GEC, the U.K.'s largest engineering and electronics company, for Boeing's PPDM software was recently signed. The contract is a three-way agreement between Boeing, Tandem Computers Inc., and GEC Computer Services, a division of GEC, which will have sublicensing rights to sell PPDM within its parent corporation. GEC will also have the right to sell the English language version of PPDM, either directly or through agents, to the European Economic Community.

- Through an alliance with NEC, network management software is being developed that provides interfaces to NEC's telecom products. Under the terms of the nonexclusive agreement, Boeing will retain all rights to its network management software. The software will be provided to NEC in addition to documentation, maintenance, and consulting support. NEC will combine the Boeing software with its own NEAX 2400-IMS PBX products under the name VISION Integrated Network Management System (VISION-NMS) and will market the product to corporations in the United States and Australia.

- BCS also has an alliance with IBM for joint bids on projects where BCS can add value in systems and network management and integration. IBM was a subcontractor to Boeing on a contract to design and implement a data communications network for New York City.

© 1990 by INPUT. Reproduction Prohibited.

- BCS has a memorandum of understanding with US West Communications that formalizes a strategic alliance between the two firms to provide network integration services to medium- to large-sized business throughout the 14 states serviced by US West.

- An alliance with Honeywell will provide access to Very-High-Speed Integrated Circuit (VHSIC) technology for specialized applications.

- BCS has an agreement with Scientific Computer Systems to provide operating system software for the SCS-40 near-supercomputer.

11. SI Marketing Strategy

INPUT believes that BCS will place increased emphasis on integration projects that are of high value (over $5 million) and that have a requirement for complex computing and network systems. This will enable it to leverage its strengths. BCS has significant strength in a number of areas that include systems and network design, and integration and management of large, complex projects. Systems integration will serve as an umbrella under which will be marketed value-added tools, products, and services such as the Integrated Network Management Software (INMS) and the Product and Process Document Management System (PPDM).

The company will round out its expertise in technology, project management, and systems/network management and integration by utilizing a wide range of development and marketing teaming and alliance partners, including computer/telecommunications hardware manufacturers, telecommunications manufacturers and carriers, and consultants.

Boeing will target vertical markets including manufacturing, utilities, transportation, pharmaceuticals, and federal, state and local governments, as well as other vertical market opportunities that are identified by alliance partners.

Exhibit BCS-5 summarizes BCS' approach.

© 1990 by INPUT. Reproduction Prohibited.

EXHIBIT BCS-5

12. SI Customer Base/Specific Projects

During 1988, BCS was awarded the following contracts:

- In December 1988, it was announced that BCS and AT&T Federal Systems Division had won a ten-year federal telecommunications system (FTS 2000) contract for the General Services Administration (GSA) to upgrade the entire federal government telephone system to a digital voice, data, and video communication network. The new system will serve about 1.3 million federal government employees in about 3,500 locations throughout the U.S., Puerto Rico, and the U.S. Virgin Islands.

- BCS won a contract to design and implement a data communications network for New York City. The network will streamline and reduce the costs of the city's information services. BCS will install, test, and maintain the network, as well as provide network management training to users. IBM is a subcontractor to BCS on this project.

- In July 1988, BCS was awarded a five-year contract from the Department of Labor's Bureau of Labor Statistics to provide networking, remote computing services, technical support, and training.

© 1990 by INPUT. Reproduction Prohibited.

- In June 1988, BCS was awarded a contract by the Internal Revenue Service to provide remote computing and technical support for several computer-based systems, including the Budget Preparation System and the Inventory Control and Distribution System, used to design, print, distribute, and stock all federal income tax forms.

- BCS, teamed with Booz-Allen & Hamilton, was selected to provide the U.S. Army Intelligence Agency with supercomputing architecture support. The BCS team will install additional computing equipment and networking, and will provide systems support. The team also will develop intelligence modeling tools and application software for the Army.

Other contracts include the following:

- Boeing implemented a $38 million supercomputer network for the State of Alabama. In its first year of operation, the system achieved an 80% usage rate, with most customers coming from business and academia. This experience strengthened BCS' qualifications to bid on other SI projects that involve supercomputers.

- During 1987, BCS was selected to provide the Technical and Management Information System for NASA's space station program. This contract includes the design and implementation of an evolutionary engineering data base system that will operate with NASA Centers, contractors, and eventually other governments as the space station is developed and implemented. This program will add to BCS' list of strong technical credentials.

- Also during 1987, BCS was awarded an eight-year contract from the U.S. Army Forces Command to design and install a management information system for its headquarters operations at Fort McPherson near Atlanta, GA. BCS will integrate the new system with existing Army computer systems and provide local-area networks, 1,200 workstations, and training services.

- BCS has designed, installed, and is operating a nationwide telecommunications network for NASA. This integrated network provides voice, data, facsimile, and full-motion video capabilities.

13. Summary and Future Directions

BCS has various strengths and weaknesses, some of which are summarized in Exhibit BCS-6. It has shown particular expertise in those disciplines related to high technology and network management and integration, including:

© 1990 by INPUT. Reproduction Prohibited.

- Systems design, integration, and management
- Network design, integration, and management
- Document management
- Image processing
- Artificial intelligence
- Supercomputing
- Facilities management and systems operation
- Program planning, management, and control
- Education and training

EXHIBIT BCS-6

BCS Summary

Capabilities

- Extensive technical expertise
- Broad range of skills and resources
- Extensive project management expertise
- Strong teaming and alliance relationships
- Strong reputation in federal marketplace
- Ability to handle large projects

Limitations

- Federal/internal orientation reputation
- Limited commercial track record
- Limited business consulting capabilities

Generally, BCS has demonstrated excellent results in dealing with the government sector and has begun to achieve success with the private sector. The limitations it must overcome include:

- BCS does not currently have a strongly developed image in the private sector. It is frequently viewed as oriented primarily to government high-technology environments. BCS has, to some extent, struggled with its commercial business, as it has attempted to eliminate its federally- and internally-oriented image. It will need to continue to focus on convincing customers that it has a long-term commitment to the commercial information services business. Recent company reorganization has strengthened the visibility of commercial business within Boeing and BCS.

- While BCS has strong technical consulting skills in focused areas, it is limited in general business consulting capabilities.

© 1990 by INPUT. Reproduction Prohibited.

- BCS, like other vendors with strong federal backgrounds, must focus on transforming its contracting, management, and pricing practices to meet the requirements of commercial customers. This is not an easy transition for a firm with a strong federal heritage.

INPUT believes that BCS will place its primary efforts on leveraging the technological and program management disciplines it has developed through implementing its federal government business and applying those skills in key vertical markets such as manufacturing and state and local government. BCS will be opportunistic in looking, often with alliance partners, for large contracts that utilize its systems and telecommunications development and management expertise.

© 1990 by INPUT. Reproduction Prohibited.

About INPUT

Company Profile

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and sevices (software, processing services, turnkey systems, systems integration, professional services, communications, and systems/software maintenance and support).

Many of INPUT's professional staff members have more than 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Staff Credentials

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

INPUT's professional staff have backgrounds in marketing, planning, information processing, and market research in some of the world's leading organizations. Many of INPUT's professional staff have held executive positions in the following business sectors:

- Computer systems
- Software
- Turnkey systems
- Field service (customer service)
- Processing services
- Professional services
- Data processing
- Network services
- Communications

© 1990 by INPUT. Reproduction Prohibited.

Educational backgrounds include both technical and business specializations, and many INPUT staff hold advanced degrees.

U.S. and European Advisory Services

INPUT offers the following advisory services on an annual subscription basis.

1. Market Analysis Program—U.S.
Provides up-to-date U.S. information services market analyses, five-year forecasts, trend analyses, vertical/cross-industry market reports, on-site presentation, annual conferences, hotline inquiry service, and sound recommendations for action. Covers software, professional and network services, turnkey systems, and professional services markets. It is designed to satisfy the planning and marketing requirements of current and potential information services vendors.

2. Market Analysis Program—Europe

3. Vendor Analysis Program—U.S.
Is a comprehensive reference service covering more than 400 U.S. information services vendor organizations. VAP is often used for competitive analysis and prescreening of acquisition and joint venture candidates. Profiles on leading vendors are updated regularly, and hotline inquiry service is provided.

4. Vendor Analysis Program—Europe

5. Electronic Data Interchange Program—U.S.
Focusing on what is fast becoming a major computer/communications market opportunity, this program keeps you informed. Through monthly newsletters, timely news flashes, comprehensive studies, a joint user/vendor conference, and telephone inquiry privileges, you will be informed and stay informed about the events and issues impacting this burgeoning market.

6. Electronic Data Interchange Program—Europe

7. Systems Integration Program
Focus is on the fast-moving world of systems integration, and the provision of complex information systems requiring multiple products and services. Covers this emerging segment in-depth by tracking both the federal and commercial markets via market analysis reports, a monthly newsletter, seminars, conferences, a presentation, and hotline inquiry service privileges.

8. Systems Integration Program—Europe

© 1990 by INPUT. Reproduction Prohibited.

9. Systems Operations Program—U.S. (1990 Program)
Includes an annual report on U.S. systems integration/operations forecast and trends, 1990-1995; 50 Vendor Analysis Profiles and updates; reports on SO network management and SO management practices; an SI client seminar; on-site presentations; access to INPUT information centers; and a "hotline" inquiry service.

8. Federal Information Systems and Services Program
Presents highly specific information on U.S. federal government procurement practices, identifies information services vendor opportunities, and provides guidance from INPUT's experienced Washington professionals to help clients maximize sales effectiveness in the federal government marketplace.

9. Information Systems Program
Is designed for executives of large information systems organizations and provides crucial information for planning, procurement, and management decision making. ISP is widely used by both user and vendor organizations.

10. Customer Service Program—U.S.
Provides customer service organization management with data and analyses needed for marketing, technical, financial, and organizational planning. The program pinpoints user perceptions of service received, presents vendor-by-vendor service comparisons, and analyzes and forecasts service markets for large systems, minicomputer, and personal computer systems, telecommunications systems, software maintenance, and third-party maintenance.

11. Customer Service Program—Europe

12. Worldwide Information Services Market Forecasts, 1989-1994
A research program providing an international forecast for the information services market was initiated by INPUT in 1989.

13. INPUT's sales office in Japan provides research services on U.S. and global information services to Japanese clients.

Customized Advisory Services

In addition to standard continuous-information programs, INPUT will work with you to develop and provide a customized advisory service that meets your unique requirements.

© 1990 by INPUT. Reproduction Prohibited.

Acquisition Services

INPUT also offers acquisition services that are tailor-made for your requirements. Our years of experience and data base of company information about information systems and services companies have helped many companies in their acquisition process.

An Effective Combination

INPUT'S Executive Advisory Services are built on an effective combination of research-based studies, client meetings, informative conferences, and continuous client support. Each service is designed to deliver the information you need in the form most useful to you, the client. Executive Advisory Services are composed of *varied combinations of the following* products and services:

Research-Based Studies
Following a proven research methodology, INPUT conducts major research studies throughout each program year. Each year INPUT selects issues of concern to management. Topical reports are prepared and delivered throughout the calendar year.

Information Service Industry Reports
INPUT's Executive Advisory Services address specific issues, competitive environment, and user expenditures relative to:

- Software
- Processing/Network Services
- Systems Integration
- Telecommunications Service
- Office Systems
- Professional Services
- Turnkey Systems
- Small-Systems Service
- Third-Party Maintenance
- Large-Systems Service

Industry-Specific Market Reports
Detailed analyses of market trends, forces driving the markets, problems, opportunities, and user expenditures are available for the following segments:

- Discrete Manufacturing
- Process Manufacturing
- Transportation
- Utilities
- Telecommunications
- Retail Distribution
- Wholesale Distribution
- Banking and Finance
- Insurance
- Medical
- Education
- Services
- Federal Government
- State and Local Government
- Other Industry Sectors

© 1990 by INPUT. Reproduction Prohibited.

Cross-Industry Market Reports

- Accounting
- Education and Training
- Engineering and Scientific
- Human Resources
- Office Systems
- Planning and Analysis
- Other Cross-Industry Sectors

Hotline: Client Inquiry Services
Daily, weekly, monthly, quarterly, and annual client planning questions are answered quickly and completely through use of INPUT's Client Hotline. Clients may call any INPUT office (California, New Jersey, Washington D.C., or London) during business hours or they may call a unique voicemail service to place questions after-hours. This effective Hotline service is the cornerstone of every INPUT Executive Advisory Service.

The Information Center
One of the largest and most complete collections of information services industry data, the Information Center houses literally thousands of up-to-date files on vendors, industry markets, applications, current/emerging technologies, and more. Clients have complete access to the Information Center. In addition to the information contained in its files, the center maintains an 18-month inventory of over 130 major trade publications, vendor consultant manuals, economic data, government publications, and a variety of important industry documents.

Access to INPUT Professional Staff
Direct access to our staff, many of whom have more than 20 years of experience in the information industry, provides you continuous research and planning support. When you buy INPUT, you buy experience and knowledge.

Annual Client Conference
Each year, you can attend INPUT's Annual Client Conference. This three-day event addresses the status and future of the information services industry, the competitive environment, important industry trends potentially affecting your business, the impact of new technology and new service offerings, and more.

You will attend with top executives from many of the industry's leading, fastest-growing, and most successful vendor companies, and with top Information Systems (IS) managers from some of the world's most sophisticated user organizations.

On-Site Presentation by INPUT Executive
Many of INPUT's Planning Services offer an informative presentation at your site. Covering the year's research, this session is held in the fourth quarter of each calendar year.

© 1990 by INPUT. Reproduction Prohibited.

Proprietary Research Service

INPUT conducts proprietary research that meets the unique requirements of an individual client. INPUT's custom research is effectively used:

For Business Planning
Planning for new products, planning for business startups, planning expansion of an existing business or product line—each plan requires reliable information and analysis to support major decisions. INPUT's dedicated efforts and custom research expertise in business planning ensure comprehensive identification and analysis of the many factors affecting the final decision.

For Acquisition Planning
Successful acquisition and divestiture of information services companies requires reliable information. Through constant contact with information services vendor organizations, continuous tracking of company size, growth, financials, and management "chemistry," INPUT can provide the valuable insight and analysis you need to select the most suitable candidates.

For the Total Acquisition Process
INPUT has the credentials, the data base of company information, and most importantly, the contacts to assist you with the total acquisition and/or partnering relationship processes:

- Due Diligence
- Schedules and Introduction
- Criteria & Definitions
- Retainer and Fee-Based
- Active Search

For Competitive Analysis
Knowing marketing and sales tactics, product capabilities, strategic objectives, competitive posture, and strengths and weaknesses of your competition is as critical as knowing your own. The career experience of INPUT's professionals, coupled with its collection and maintenance of current financial, strategic, tactical, and operational information about more than 400 active companies, uniquely qualifies INPUT to provide the best competitive information available today.

For Market and Product Analysis
Developing new products and entering new markets involves considerable investment and risk. INPUT regularly conducts research for clients to identify product requirements, market dynamics, and market growth.

© 1990 by INPUT. Reproduction Prohibited.

More About INPUT...

- More than 5,000 organizations, worldwide, have charted business directions based on INPUT's research and analysis.
- Many clients invest more than $50,000 each year to receive INPUT's recommendations and planning information.
- INPUT regularly conducts proprietary research for some of the largest companies in the world.
- INPUT has developed and maintains one of the most complete information industry libraries in the world (access is granted to all INPUT clients).
- INPUT clients control an estimated 70% of the total information industry market.
- INPUT analyses and forecasts are founded upon years of practical experience, knowledge of historical industry performance, continual tracking of day-to-day industry events, knowledge of user and vendor plans, and business savvy.
- INPUT analysts accurately predicted the growth of the information services market—at a time when most research organizations deemed it a transient market. INPUT predicted the growth of the microcomputer market in 1980 and accurately forecasted its slowdown in 1984.

For More Information . . .
INPUT offers products and services that can improve productivity, and ultimately profit, in your firm. Please give us a call today. Our representatives will be happy to send you further information on our services or to arrange a formal presentation at your offices.

For details on delivery schedules, client service entitlement, or Hotline support, simply call your nearest INPUT office. Our customer support group will be available to answer your questions.

- **California** ..... (415) 961-3300
- **New Jersey** ..... (201) 299-6999
- **Washington, D.C.** ..... (703) 847-6870
- **London** ..... (01) 493-9335
- **Paris** ..... (33-1) 42-77-42-77
- **Tokyo** ..... (03) 864-0531

© 1990 by INPUT. Reproduction Prohibited.

© 1990 by INPUT. Reproduction Prohibited.